Date:

10 August 1998

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100 D Areas - Full Protocol

Subject: Inorganics - Data Package No. W02330-QES (SDG No.

INTRODUCTION

This memo presents the results of data validation on Data Package No. QES prepared by Quanterra Environmental Services (QES). A list of samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BONKT3	04/15/98	Soil	С	See Note 1
BONKT4	04/15/98	Soil	С	See Note 1
BONKT5	04/15/98	Soil	С	See Note 1
BONKT6	04/15/98	Soil	С	See Note 1
BONKT7	04/15/98	Soil	С	See Note 1
BONKT8	04/15/98	Soil	С	See Note 1
BONKT9	04/15/98	Soil	С	See Note 1

^{1 -} ICP metals (6010A), Mercury (7471-CV), Hexavalent Chromium (7196)

Data validation was conducted in accordance with the BHI validation statement of work and the 100 Area Remedial Action Sampling and Analysis Plan (May 1998). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times are assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 6 months for ICP metals, 28 days for mercury, and 30 days for hexavalent chromium.

All holding times were acceptable.

Blanks

Preparation Blanks

At least one preparation blank, consisting of deionized distilled water processed through each sample preparation and analysis procedure, must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with digestate concentrations (in ug/L) less than five times the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of greater than five times the highest blank concentration do not require qualification.

In the case of negative blank results, if the absolute value exceeds the Contract Required Detection Limit (CRDL), all nondetects are rejected and flagged "UR" and all detects that are less than ten times the absolute value of the associated preparation blank result are qualified as estimates and flagged "J". If the absolute value of the negative preparation blank is greater than the IDL and less than or equal to the CRDL, all nondetects are qualified as estimates and flagged "UJ" and all detects less than ten times the absolute value of the blank are qualified as estimates and flagged "J". If the sample results are greater than ten times the absolute value of the preparation blank, no qualification is necessary.

Due to blank contamination, chromium (ICP) results in samples BONKT3 and BONKT4 were qualified as undetected and flagged "U".

Due to blank contamination, the lead result in sample BONKT4 was qualified as undetected and flagged "U".

All other preparation blank results were acceptable.

Field and Equipment Blanks

One equipment blank (BONKT3) and one field blank (BONKT4) were submitted for

analysis. The barium, chromium, and lead were detected above the IDL in both the equipment and field blank. No other analytes were detected in the field or equipment blank.

Accuracy

Matrix Spike

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 70% to 130%. Samples with a spike recovery of less than 30% and a sample result below the IDL are rejected and flagged "UR". Samples with a spike recovery of 30% to 69% and a sample result less than the IDL are qualified "UJ". Samples with a spike recovery of greater than 130% or less than 70% and a sample result greater than the IDL are qualified as estimates and flagged "J". Finally, for samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

Due to a matrix spike recovery of -8.7%, all barium results were rejected and flagged "R".

Due to a matrix spike recovery of 30% and a matrix spike duplicate recovery of 32%, all hexavalent chromium results were qualified as estimates and flagged "J/UJ".

All other matrix spike results were acceptable.

Precision

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 30% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

Due to the lack of a matrix spike and matrix spike duplicate recovery, any RPD calculation for barium would be invalid.

All other laboratory duplicate recovery results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No. Duplicate Sample No.

BONKT5 BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for lead was outside QC limits (48%). Under the BHI statement of work no qualification is required. All other field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against CRDLs to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific CRDL.

Completeness

Data package No. W02330-QES (SDG No. W02330) was submitted for validation and verified for completeness. The completion percentage was 87.5%.

MAJOR DEFICIENCIES

Due to a matrix spike recovery of -8.7%, all barium results were rejected and flagged "R".

MINOR DEFICIENCIES

Due to blank contamination, chromium (ICP) results in samples BONKT3 and BONKT4 were qualified as undetected and flagged "U". Due to blank contamination, the lead result in sample BONKT4 was qualified as undetected and flagged "U". Due to a matrix spike recovery of 30% and a matrix spike duplicate

recovery of 32%, all hexavalent chromium results were qualified as estimates and flagged "J/UJ". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, May 1998.

Project: BECHTEL-HA	roject: BECHTEL-HANFORD																											
Laboratory: Quantern				1																								
	SDG: V	/02330		1																								
Sample Number		BONKT3		BONKT4		BONKT5		BONKT6	BONKT7		BONKT8		BONKT9	L		[
Location		1607-D2		1607-D2		1607-D2		1607-D2	1607-D2		1607-D2		1607-D2															
Remarks		Equip. Bla	enk	Field Blan	k			Duplicate	-																			
Sample Date		04/15/98		04/15/98		04/15/98			04/15/98		04/15/98		04/15/98															
Inorganics	CRDL										Result (Result Q		sult	Q	Result	Q	Result	ø	Result	Q	Result	Q	Result	Q	Resu	alt Q
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Arsenic		0.19	U	0.19		1.1		0.84	1.1	┙	0.67		1.1	上								L		L		$oxed{oxed}$	$oxed{oxed}$	L_
Barlum		220		0.95		51.7		51.6 R	53.9 R		52.7 F		62.4 R	丄		_		_				L		匚		┖	ـــــ	
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Qualifiers which may be applied by data validators in compliance with BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: W02330	REVIEWER:	DATE: 08/10/98	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Barium	R	All	MS/MSD recovery
Chromium (ICP)	U	BONKT3, BONKT4	Blank contamination
Lead	U	BONKT4	Blank Contamination
Hexavalent chromium	J/UJ	All	MS/MSD recovery

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HA	roject: BECHTEL-HANFORD																											
Laboratory: Quantern				1																								
	SDG: V	/02330		1																								
Sample Number		BONKT3		BONKT4		BONKT5		BONKT6	BONKT7		BONKT8		BONKT9	L		[
Location		1607-D2		1607-D2		1607-D2		1607-D2	1607-D2		1607-D2		1607-D2															
Remarks		Equip. Bla	enk	Field Blan	k			Duplicate	-																			
Sample Date		04/15/98		04/15/98		04/15/98			04/15/98		04/15/98		04/15/98															
Inorganics	CRDL										Result (Result Q		sult	Q	Result	Q	Result	ø	Result	Q	Result	Q	Result	Q	Resu	alt Q
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Barlum		220		0.95		51.7		51.6 R	53.9 R		52.7 F		62.4 R	丄		_		_				L		匚		┖	ـــــ	
Cadmium		0.06		0.06		0.06	U	0.06 U	0.06 U	<u> </u>	0.06	j	0.07 U	_		_		_				L				上	<u> </u>	
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U.S. EPA - CLP EPA SAMPLE NO. INORGANIC ANALYSES DATA SHEET BONKT3 _ab Name: QUANTERRA MO_ Contract: 550.231 SDG No.: W02330 Case No.: lab Code: ITMO___ SAS No.: fatrix (soil/water): SOIL_ Lab Sample ID: 17539-001 Level (low/med): LOW Date Received: 04/15/98 & Solids: 98.6 Concentration Units (ug/L or mg/kg dry weight): MG/KG CAS No. Analyte Concentration | C М ₽ 7440-38-2 <u>0.19|</u>0 Arsenic P_ 7440-39-3 Barium 220 **p**-<u>0</u>.06∫ប៊ 7440-43-9 Cadmium P-7440-47-3 Chromium 0.16|B|P-Lead 7439-92-1 4.2 Č₩ 7439-97-6 Mercury 0.02 U 7440-22-4 Silver P__ 0.07 U

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INORGANIC ANALYSES DATA SHEET

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atrix (soil/wa evel (low/med) Solids:	ter): SOIL): LOW_ _99.	_	I I	Lab Sample Date Receiv	ID: 17539-002 ved: 04/15/98
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1	CAS No.				<u> </u>					
	CAS NO.	Analyte	Concentration	C Q I	M					
	7440-38-2	Arsenic	1.1	-	P					
	7440-39-3	Barium -	51.7	- NE	P- R					
	7440-43-9	Cadmium	0.06	ʊ ── ── :	P					
	7440-47-3	Chromium_	3.8		P ⁻					
	7439-92-1	Lead	1.8		P					
	7439-97-6	Mercury_	0.02		C <u>V</u>					
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Co	CAS No.		/L or mg/kg dry		_ _i
	7440-38-2 7440-39-3 7440-43-9 7440-47-3 7439-92-1	Analyte Arsenic_ Barium_ Cadmium_ Chromium_ Lead Mercury_ Silver	Concentration	U N	
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Level (low/med	d): LOW		I	Date Recei	Lved: 04/15/98
ß Solids:	_82.	4			
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	7440-39-3	Barium -	62.4	142	P_/C
	7440-43-9	Cadmium	0.07	 	p
	7440-47-3	Chromium	5.9		P ⁻
	7439-92-1	Lead	1.8	-	p-
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	7440-22-4	Silver	0.08	ים	P_ '
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000018



LAB NAME: 1

LAB SAMPLE ID:

QUANTERRA, Richland

80426101

SDG: /RPT GRP:

W02330 / 5017

26101 **N**

MATRIX:

SOIL

CLIENT ID:

BONKT3

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDAIDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.00E-02	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196UJ
AM-241	1.17E-01	J	5.4E-02	5.8E-02	2.50E-02	pCi/g	79.80%	RICHRC5057
U-234	3.30E-01	J	8.4E-02	9.9E-02	2.14E-02	pCi/g	79.70%	RICHRC5030
U-235	1.02E-02	U	1.5E-02	1.5E-02	2.14E-02	pCl/g	79.70%	RICHRC5030
U-238 -,	2.97E-01	J	8.0E-02	9.3E-02	2.66E-02	pCi/g	79.70%	RICHRC5030
PU-238	1.52E-02	\	1.5E-02	1.5E-02	1.03E-02	pCl/g	78.40%	RICHRC5010
PU239/40	9.81E-02		3.9E-02	4.1E-02	1.90E-02	pCVg	78.40%	RICHRC5010
AM-241	1.05E-02	U	1.92-02	1.9E-02	3.15E-02	pCVg	N/A	RICHRC5017
CO-60	-9.88E-04	IJ	3.9E-03	3.9E-03	6.63E-03	pCi/g	N/A	RICHRC5017
CS-137DA	-7.16E-04	U	3.1E-03	3.1E-Q3	5.14E-03	pCi/g	NA	RICHRC5017
EU-152	3.08E-03	U	7.4E-03	7.4E-03	1.26E-02	pCl/g	N/A	RICHRC5017
EU-154	1.29E-02	U	1.0E-02	1.0E-02	2.09E-02	pCl/g	N/A	RICHRC5017
EU-155	5.68E-03	U	9.4E-03	9.4E-03	1.53E-02	pCi/g	N/A	RICHRC5017
K-40	3.44E+00		1.6E-01	3.8E-01	N/A	pCt/g	N/A	RICHRC5017
RA-224DA	9.57E-02		1.1E-02	1.4E-02	N/A	pCVg	NA	RICHRC5017
RA-226	7.21E-02	J	1.7E-02	1.9E-02	N/A	pCVg	NA /	RICHRC5017
RA-228	1.15E-01	J	2.4E-02	2.6E-02	N/A	pCi/g	N/A	RICHRC5017
U-238	2.56E-01		2.0E-01	2.0E-01	N/A	pCVg	N/A	RICHRC384Z
						=		

Number of Results: 18

pu 8/1/28



LAB NAME: 1

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426102

MATRIX:

SOIL

CLIENT ID:

BONKT4

DATE RECEIVED:

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	ANAL VTE	DECLII T	_	COUNTING	TOTAL		REPORT	VIELD	METHOD
	ANALYTE	RESULT	Q	ERROR (2s)	ERROR (2s)	MDA/IDL	UNIT	YIELD	NUMBER
_	HEXCHROME	3.00E-02	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196U]
	AM-241	-3.61E-04	U	7.2E-04	7.2E-04	1.81E-02	pCi/g	84.10%	RICHRC5057
	U-234	3.15E-01	J	8.8E-02	1.0E-01	3.86E-02	pCVg	75.20%	RICHRC5030
	U-235	2.21E-02	U	2.4E-02	2.4E-02	3.21E-02	pCi/g	75.20%	RICHRC5030
	·U-238 -,	3.60E-01	J	9.3E-02	1.1E-01	2.74E-02	pCi/g	75.20%	RICHRC5030
	PU-238	1.64E-02	¥	2.3E-02	2.3E-02	2.21E-02	pCi/g	40.40%	RICHRC5010
	PU239/40	6.48E-02		4.6E-02	4.8E-02	3.29E-02	pCl/g	40.40%	RICHRC5010
	AM-241	1.65E-02	U	2.1E-02	2.1E-02	3.54E-02	pCi/g	N/A	RICHRC5017
	CO-60	-9.16E-04	U	4.7E-03	4.7E-03	7.82E-03	pCl/g	N/A	RICHRC5017
	CS-137DA	-2.10E-03	IJ	4.7E-03	4.7E-03	7.41E-03	pCVg	N/A	RICHRC5017
	EU-152	4.85E-03	U	1.2E-02	1.2E-02	2.12E-02	pCVg	N/A	RICHRC5017
	EU-154	. 1.06E-02	U ·	1.6E-02	1.6E-02	2.92E-02	pCi/g	N/A	RICHRC5017
	EU-155	7.26E-03	U	1.5E-02	1.5E-02	2.36E-02	pCi/g	N/A	RICHRC5017
	K-40	4.73E+00		2.5E-01	5.4E-01	· N/A	pCVg	N/A	RICHRC5017
	RA-224DA	1.26E-01		1.6E-02	2.0E-02	N/A	pCi/g	MALE	RICHRC5017
	RA-226	1.39E-01		1.9E-02	2.4E-02	N/A	pCVg	NA	RICHRC5017
	RA-228	1.72E-01	J	3.8E-02	4.2E-02	N/A	pCl/g	N/A	RIGHRC5017
	U-238	3.07E-01	U	1.9E-01	1.9E-01	3.18E-01	pCl/g	N/A	RICHRC504Z
							=		

Number of Results: 18

1/1/28



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426103

MATRIX:

SOIL

CLIENT ID:

BONKT5

DATE RECEIVED:

4/15/1998 1:50:00 PM

			COUNTING	TOTAL		BEDORT		METHOD
ANALYTE	RESULT	Q	ERROR (2s)	ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	NUMBER
HEXCHROME	3.00E-02	Ü	N/A	NA	3.00E-02	mg/kg	N/A	EPA7196 UJ
AM-241	1.23E-02	J	1.4E-02	1.4E-02	1.11E-02	pCi/g	95. 9 0%	RICHRC5057
U-234	5.91E-01	J	1.1E-01	1.4E-01	2.75E-02	p Ci/g	85.10%	RICHRC5030
U-235	2.94E-02	U	2.6E-02	2.6E-02	3.53E-02	pCi/g	85.10%	RICHRC5030
U-238 _{-,}	6.49E-01	J	1.1E-01	1.5E-01	2.88E-02	pCi/g	85.10%	RICHRC5030
PU-238	5.57E-03	¥	1.5E-02	1.5E-02	3.65E-02	pCi/g	45.80%	RICHRC5010
PU239/40	1.81E-01		7.3E-02	8.0E-02	3.65E-02	p Ci/g	45.80%	RICHRC5010
AM-241	1.91E-02	U	7.5E>92	7.5E-02	1.16E-01	pCi/g	N/A	RICHRC5017
CO-60	1.17E-02	U	6.7E-03	6.8E-03	1.28E-02	pCVg	N/A	RICHRC5017
CS-137DA	-1.55E-03	U	7.0E-03	7.0E-03	1.09E-02	pCl/g	N/A	RICHRC5017
EU-152	3.81E-03	U	1.7E-02	1.7E-02	2.90E-02	pCl/g	N/A	RICHRC5017
EU-154	-1.12E-02	U.	2.5E-02	2.5E-02	4.01E-02	pCl/g	N/A	RICHRC5017
EU-155	-9.54E-03	U	2.4E-02	2.4E-02	3.91E-02	_pCi/g	N/A	RICHRC5017
K-40	8.24E+00		3.1E-01	8.8E-01	. N/A	pCVg	N/A	RICHRC5017
RA-224DA	4.68E-01		2.1E-02	5.1E-02	N/A	pCl/g	NA M	RICHRC5017
RA-226	2.92E-01		2.5E-02	3.8E-02	N/A	pCl/g	N/A	RICHRC5017
RA-228	4.38E-01		6.1E-02	7.5E-02	N/A	pCi/g	NA /	RICHRC50:7
U-238	4.34E-01	U	5.1E-01	5.1E-01	8.03E-01	pCVg	NA	RICHRC50-7
				-				

Number of Results: 18

PHV 8/7/58



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426104

MATRIX:

SOIL

CLIENT ID:

BONKT6

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.00E-02	Ų	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196 U
AM-241	5.09E-03	U	1.0E-02	1.0E-02	1.38E-02	pCi/g	74:70%	RICHRC5057
U-234	5.04E-01	J	1.1E-01	1.3E-01	3.11E-02	pCi/g	76.80%	RICHRC5030
Ų-235	1.72E-02	U	2.2E-02	2.2E-02	3.89E-02	pCi/g	76.80%	RICHRC5030
U-238 -,	6.25E-01	J	1.2E-01	1.6E-01	2.93E-02	pCi/g	76.80%	RICHRC5030
PU-238	-3.55E-03	¥	3.2E-03	3.2E-03	5.01E-02	pCVg	45.60%	RICHRC5010
PU239/40	1.68E-01		7.7E-02	8.4E-02	2.40E-02	pCVg	45.60%	RICHRC5010
AM-241	-7.88E-03	Ų	7.3E-02	7.3E-02	1.16E-01	pCi/g	N/A	RICHRC5017
CO-60	-4.35E-03	U	6.9E-03	6.9E-03	1.09E-02	pCi/g	N/A	RICHRC5017
CS-137DA	-3.34E-03	U	6.0E-03	6.0E-Q3	9.97E-03	pCi/g	N/A	RICHRC5017
EU-152	1.22E-02	U	1.7E-02	1.7E-02	_3.00E-02	pCi/g	N/A	RICHRC5017
EU-154	6.71E-03	U-	2.5E-02	2.5E-02	4.18E-02	pCi/g	N/A	RICHRC5017
EU-155	3.07E-02	U	2.4E-02	2.4E-02	4.06E-02	_pCi/g	N/A	RICHRC5017
K-40	8.26E+00		3.0E-01	8.8E-01	: N/ A	pCl/g	N/A	RICHRC5017
RA-224DA	4.44E-01		2.0E-02	4.9E-02	N/A	pCi/g	NA DE	RICHRC5017
RA-226	2.82E-01		2.4E-02	3.7E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228	4.58E-01		5.6E-02	7.2E-02	N/A	pCi/g	N/A	RIGHRC5017
U-238	5.63E-01	U	4.9E-01	4.9E-01	8.05E-01	pCi/g	N/A	RICHRC501Z

Number of Results: 18

ph/7/55



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426105

MATRIX:

SOIL

CLIENT ID:

BONKT7

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3,00E-02	Ü	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	1.70E-02	J	1.7E-02	1.7E-02	1.15E-02	pCi/g	92.20%	RICHRC5057
U-234	6.67E-01	J	1.4E-01	1.8E-01	4.27E-02	pCl/g	62.70%	RICHRC5030
U-235	1.87E-02	U	2.5E-02	2.5E-02	4.07E-02	pCl/g	62.70%	RICHRC5030
· U-238 -	6.69E-01	J	1.4E-01	1.8E-01	3.29E-02	pCi/g	62.70%	RICHRC5030
PU-238	2.26E-02	¥	2.7E-02	2.7E-02	3.12E-02	pCi/g	51.80%	RICHRC5010
PU239/40	9.95E-02		5.6E-02	5.9E-02	3.54E-02	pCi/g	51.80%	RICHRC5010
AM-241	8,16E-03	U	4.3E-92	4.3E-02	6.67E-02	pCl/g	N/A	RICHRC5017
CO-60	1.29E-02	U	7.2E-03	7.3E-03	1.40E-02	pCVg	N/A	RICHRC5017
CS-137DA	7.22E-03	Ų	7.0E-03	7.0E-03	1.23E-02	pCVg	N/A	RICHRC5017
EU-152	1.12E-02	U	1.7E-02	1.7E-02	2.93E-02	pCi/g	N/A	RICHRC5017
EU-154	. 1.35E-02	U	2.6E-02	2.6E-02	4.44E-02	pCl/g	N/A	RICHRC5017
EU-155	3.02E-02	U	2.1E-02	2.1E-02	3.42E-02	_pCi/g	N/A	RICHRC5017
K-40	8.69E+00		3.3E-01	9.3E-01	. N/A	pCVg	N/A	RICHRC5017
RA-224DA	4.61E-01		2.2E-02	5.1E-02	N/A	pCVg	NADU.	RICHRC5017
RA-226	3.15E-01		3.4E-02	4.6E-02	N/A	pCi/g	NA	RICHRC5017
RA-228	4.44E-01		6.0E-02	7.4E-02	N/A	pCl/g	N/A	RISHRC5017
U-238	1.93E-01		4.2E-01	4.2E-01	N/A	pCi/g	N/A	RICHROSON

Number of Results: 18

8/7/88



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426106

MATRIX:

SOIL

CLIENT ID:

BONKT8

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
 HEXCHROME	3.00E-02	Ų	N/A	N/A	3.00E-02	mg/kg	N/A	EPA71960]
AM-241	4.97E-02	J	3.1E-02	3.2E-02	1.35E-02	pCi/g	80.10%	RICHRC5057
U-234	5.09E-01	J	1.0E-01	1.3E-01	3.73E-02	pCi/g	80.90%	RICHRC5030
Ų-235	4.64E-02	J	3.3E-02	3.3E-02	3.73E-02	pCVg	80.90%	RICHRC5030
U-238 -	5.08E-01	J	1.0E-01	1.3E-01	3.18E-02	pCi/g	80.90%	RICHRC5030
PU-238	2.75E-02		2.5E-02	2.5E-02	2.25E-02	pCi/g	75.90%	RICHRC5010
PU239/40	3.75E-01	`	9.2E-02	1.1E-01	1.51E-02	pCi/g	75.90%	RICHRC5010
AM-241	-6.54E-03	Ü	2.8E-02	2.8E-02	4.45E-02	pCi/g	N/A	RICHRC5017
CO-60	1.48E-02	บ	6.6E-03	6.8E-03	1.31E-02	pCi/g	N/A	RICHRC5017
CS-137DA	2.75E-03	U	6.4E-03	6.5E-03	1.07E-02	pCl/g	N/A	RICHRC5017
EU-152	2.11E-02	U	1.6E-02	1.6E-02	2.83E-02	pCl/g	N/A	RICHRC5017
EU-154	1.92E-02	U	2.2E-02	2.2E-02	3.93E-02	pCi/g	N/A	RICHRC5017
EU-155	4.24E-02	U	2.1E-02	2.1E-02	3.39E-02	pCl/g	N/A	RICHRC5017
K-40	8.52E+00		3.3E-01	9.2E-01	N/A	pCl/g	N/A	RICHRC5017
RA-224DA	4.18E-01		2.1E-02	4.7E-02	N/A	pCi/g	NA /	-RICHRC5017
RA-226	3.04E-01		3.0E-02	4.3E-02	N/A	pCl/g	NA	RICHRC5017
RA-228	4.10E-01		5.2E-02	6.6E-02	N/A	pCVg	N/A	RICHRC5017
U-238	1.33E-01	U	2.4E-01	2.4E-01	3.85E-01	pCi/g	N/A	RICHRC5017

Number of Results: 18

PM 8/7/98



LAB NAME:

QUANTERRA, Richland

80426107

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

MATRIX:

SOIL

CLIENT ID:

BONKT9

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2 s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
HEXCHROME	3.00E-02	Ü	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196U
AM-241	6.53E-03	U	1.4E-02	1.4E-02	2.86E-02	pCi/g	77.80%	RICHRCS057
U-234	6.41E-01	J	1.2E-01	1.6E-01	2.89E-02	pCi/g	72.60%	RICHRC5030
Ų-235	3.01E-02	U	2.9E-02	2.9E-02	3.98E-02	pCVg	72.60%	RICHRC5030
U-238 -,	7.62E-01	J	1.3E-01	1.8E-01	3.27E-02	pCVg	72.60%	RICHRC5030
PU-238	1.94E-02	¥	2.9E-02	2.9E-02	4.07E-02	pCi/g	41.90%	RICHRC5010
PU239/40	1.00E-01		6.4E-02	6.7E-02	4.07E-02	pCi/g	41.90%	RICHRC5010
AM-241	-7.23E-02	ប	8.3E-02	8.3E-02	1.30E-01	pCVg	NA	RICHRC5017
CO-60	9.39E-03	U	7.3E-03	7.4E-03	1.34E-02	pCl/g	N/A	RICHRCS017
CS-137DA	2.68E-03	U	6.9E-03	7.0E-03	1.19E-02	pCVg	N/A	RICHRC5017
EU-152	2.95E-02	U	1.9E-02	1.9E-02	3.35E-02	рСИд	N/A	RICHRCS317
EU-154	. 3.50E-04	U ·	2.6E-02	2.6E-02	4.09E-02	pCVg	N/A	RICHRC5017
EU-155	2.35E-02	U	2.6E-02	2.6E-02	4.42E-02	pCVg	N/A	RICHRC5017
K-40	8.68E+00		3.3E-01	9.3E-01	. N/A	pCVg	N/A	RICHRC5317
RA-224DA	4.72E-01		2.2E-02	5.2E-02	N/A	pCVg	NHA 1	RICHRC5017
RA-226	2.94E-01		2.6E-02	3.9E-02	N/A	pCl/g	N/A X	RICHRC5017
RA-228	4.87E-01		5.9E-02	7.7E-02	N/A	pCVg	N/A	RICHRC5017
U-238	3.80E-02	U	5.3E-01	5.3E-01	8.48E-01	pCVg	N/A	RICHROSTH

Number of Results: 18

pw 8/1/98

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Quanterra Incorporated 13715 Rider Trail North Earth City, Missouri 63045

314 298-8566 Telephone 314 298-8757 Fax

CASE NARRATIVE

Bechtel Hanford Incorporated 3350 George Washington Way Richland, Washington 99352

May 28, 1998

Attention: Joan Kessner

Attention. Joan Ressie.

Project Number : 550.231 SDG : W02330 Number of Samples : Seven (7)

Sample Matrix : Soil

Data Deliverable : Summary

Date SDG Closed : April 15, 1998



On April 15, 1998, seven (7) "soil" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. There are no comments or nonconformances associated with the shipping and receiving of these samples. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

St. Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
17539-001	B0NKT3	80426001	Soil	15-APR-98
17539-002	B0NKT4	80426002	Soil	15-APR-98
17539-003	B0NKT5	80426003	Soil	15-APR-98
17539-004	B0NKT6	80426004	Soil	15-APR-98
17539-005	B0NKT7	80426005	Soil	15-APR-98
17539-006	BONKT8	80426006	Soil	15-APR-98
17539-007	BONKT9	80426007	Soil	15-APR-98





Bechtel Hanford Incorporated

May 28, 1998

Project Number: 550.231

SDG: W02330

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III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested:

ICP Metals by EPA method 6010 (Supertrace){Arsenic, Barium,

Cadmium, Chromium, Lead, Silver

Mercury by EPA method 7471 Pest/PCBs by EPA method 8080

Semi-Volatiles by EPA method 8270 (TCL) {Bis(2-ethylhexyl

phthalate}

Deviation from Request:

No Deviation from requested methods.

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK-

Quality Control Blank, Method Blank

OCLCS-

Quality Control Laboratory Control Sample, Blank Spike

MS-

Matrix Spike

MSD-

Matrix Spike Duplicate

V. Comments

General:

No general comments were noted.

Inorganics:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix

Spike Duplicate were analyzed with each preparation batch per the

protocol for this analysis.



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Page 3

Inorganics: (cont.)

The recoveries of the matrix spike and the matrix spike duplicate for the following list of elements were not within the 80%-120% range, therefore all associated data was flagged with a "N".

	% REC	% REC
Barium	0	0
Mercury	122.3	121.3

Pest/PCBs:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

No problems were noted during the analyses of these samples.

Semi-VOA:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

No problems were noted during the analyses of these samples.

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Robert E. White Project Manager



RECEIVED

Quanterra Incorporated 2800 George Washington Way Richland, Washington 99352

509 375-3131 Telephone 509 375-5590 Fax

CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

May 1, 1998

Attention: Joan Kessner

SAF Number : B98-022

Date SDG Closed : April 15, 1998 Number of Samples : Seven (7)

Sample Type : Soil SDG Number : W02330

Data Deliverable : 15 Day Priority/21 Day Summary

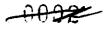


On April 15, 1998, seven 15 day priority, soil samples were received by the Quanterra Environmental Services Richland Laboratory (QESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

OESRL ID#	BHI ID#	<u>MATRIX</u>	DATE OF RECEIPT
80426101	B0NKT3	Soil	4/15/98
80426102	B0NKT4	Soil	4/15/98
80426103	B0NKT5	Soil	4/15/98
80426104	BONKT6	Soil	4/15/98
80426105	BONKT7	Soil	4/15/98
80426106	BONKT8	Soil	4/15/98
80426107	B0NKT9	Soil	4/15/98

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.





Bechtel Hanford, Inc. May 1, 1998 Page 2

The requested analyses were:

Alpha Spectroscopy

Americium-241 by method RICH-RC-5057

Plutonium-238, -239/40 by method RICH-RC-5057 Uranium-234, -235, -238 by method RICH-RC-5030

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

Chemical Analyses

Chromium Hex by EPA method 7196

III. Quality Control

The samples analyzed under SDG W02330 were processed as quick turn samples and had two Laboratory Control Samples (LCS and LCS duplicate) and one method (reagent) blank analyzed with the batch. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Alpha Spectroscopy

Americium-241 by method RICH-RC-5057

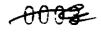
The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements. Thorium-228 was present in samples B0NKT3, B0NKT4, B0NKT5 and B0NKT6, therefore, the 85% abundant peak for Am-241 at 5486 KEV was analyzed but the thorium-228 region of interest was not analyzed since it would have interfered with the americium region of interest.

Plutonium-238, -239/40 by method RICH-RC-5010

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements. The LCS had a high bias of 139.6% recovery. Since the bias met the second level of the evaluation criteria, you gave approval to report the data.

Uranium-234, -235, -238 by method RICH-RC-5030

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements.





Bechtel Hanford, Inc. May 1, 1998 Page 3

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196

The LCS, batch blank, sample duplicate (B0NKT7) and sample results are within contractual requirements. The MS/MSD (B0NKT7) had low recoveries due to matrix interference.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Andy Kopriva Project Manager

-0094

Bechtel Hanford Inc.	l Inc.	CIIA	CIIAIN OF CUSTOL	Y/SAM	TODY/SAMPLE ANALYSIS REQUEST	ALYSIS	S REQU	EST		=	11-020-031-11] James	-
Collector Mike Stankovich / 13R 7 44~ 7	4~+	9	Company, Contact 'Cary Hamilton	Teles	Telephone No. 531-0731			Project Coordinator KOHRNER, CC	dinator 1, CC	Pate.	Data Turnerousd		
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LABORATORY Recoved By				<u>#</u>				į			Date/Time		
FINAL SAMPLE Disposed Medical	tetod					Disposed By					Date/Time		
DISPOSITION													

Bechtel Hanford Inc. Cli	AIN OF CUSTOI)Y/SAM	PLE AI	IALYSI:	S REQU	EST			B98-022-1	2 Page	I = I
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hipped Te Quanterts incorporated	Offsite Property No.		:	1		Bill of Ladi N/A	ng/Air Bili I	No.			
OSSIBLE SAMPLE HAZARDS/REMARKS	Preservation	Neet	Coal 4C	None	None	None	Cool 4C	Cool 4C	None		
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	No. of Container(s)					1			3		
pecial linuding and/or Storage	Volume	30ml	60ml	60ml	60ml	60mi	120mi	120ml	1000ml		T
BAMPLE ANALYSIS		Antivity Sun	Chrombun Hex - 7196	Americhen- 241; festople Platenium; jeotopie (frankum	See how (f) in Special Instructions.	Mortury - 7471 - (CV)	PLOFCIO • •••• (TCL)	Semi-VOA - 8270A (TCL) (Ble(3 ₂ obylkenyl) philoson)	Bee Isam (2) in Special Instrugilons.		
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Appendix 5

Data Validation Supporting Documentation

WHC-SD-EN-SPP-002, Rev. 2

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	©	D	E
PROJECT: 10	OD Are	۹.5	DATA PACKAGE	: 602330	oʻ
VALIDATOR:	TLI	LAB: QE	S	DATE: 8/5/	158
CASE:			SDG: Wor	2330	
		ANALYSES	PERFORMED		
СТРИСР	☐ CLP/GFAA	X CLP/He	CLP/Cyanida	RCRII	Ö .
□ \$W-846ЛСР	☐ SW-846/GFAA	□ SW-846/Hg	□ 8W-848 Cyenide	۵	ם
SAMPLES/MATE	RIX		- · · · · · · · · · · · · · · · · · · ·		
BONKT	13. BON	×T4, B0	NKTS, B	ONKTC, G	BONKTY
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1. DATA PACK	AGE COMPLETEN	IECC AND CACE	MADDATTVE	٠	_
			nakkailte n present? .	(\cdot,\cdot)	Yes No N/A
			· · · · · · · ·	í	Yes No N/A
Comments:		16:			163 110 1177
COMMICH 63 *				:	
					
2. HOLDING 1					
Are sample ho	olding times a	acceptable?		(Yes No N/A
Comments:	<u></u>	·			
			· · · · · · · · · · · · · · · · · · ·		
	····				<u> </u>

000036

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

3. INSTRUMENT PERFORMANCE AND CALIBRATIONS	}
Were initial calibrations performed on all instruments? Yes No NA	
Are initial calibrations acceptable? Yes No N/A	L
Are ICP interference checks acceptable? Yes No N/A	
Were ICV and CCV checks performed on all instruments? Yes No $ N/A $	L-1
Are ICV and CCV checks acceptable? Yes No N/A	
Comments:	L j
4. BLANKS	
Were ICB and CCB checks performed for all applicable analyses? Yes No $\sqrt{N/A}$	
Are ICB and CCB results acceptable? Yes No (N/A)	
Were preparation blanks analyzed?	
Are preparation blank results acceptable? Yes No N/A Jank	
Were field/trip blanks analyzed? Yes No (N)	_ }
Are field/trip blank results acceptable?	「富田
Comments: Chronium (10p) + lead	
FB+TB- Buryon lend Chrose	وستم.
5. ACCURACY	- ,
Were spike samples analyzed? Yes No N/A	
Are spike sample recoveries acceptable? Yes No N/A	
Were laboratory control samples (LCS) analyzed? Yes No (N/A)	
Are LCS recoveries acceptable? Yes No (N/A)	
Comments: Berich -8.7	
CR C MSD 32% MS 30% J/W	
·	
	L .ZJ
	L ,

INORGANIC ANALYSIS DATA VALIDATION CHECKLIST

6. PRECISION		
Were laboratory duplicates analyzed? Yes	No	n/a
Are laboratory duplicate samples RPD values acceptable? Yes	No	N/A
Were ICP serial dilution samples analyzed? Yes	No	M/A
Are ICP serial dilution %D values acceptable? Yes	No	N/A
Are field duplicate RPD values acceptable? Yes	(No)	N/AT
Are field split RPD values acceptable? Yes	No	\N/A
Comments: 3arium -8.78.0		
CAT CONTRACTOR OF THE PROPERTY		
CR to MSte		
FD 122 4840		
7. FURNACE AA QUALITY CONTROL	<u>:</u>	
Were duplicate injections performed as required? Yes	No	N/A
Are duplicate injection %RSD values acceptable? Yes	No	N/A
Were analytical spikes performed as required? Yes	No	N/A
Are analytical spike recoveries acceptable? Yes	No	N/A
Was MSA performed as required? Yes	No	N/A
Are MSA results acceptable? Yes	No	N/A
Comments:		
8. REPORTED RESULTS AND DETECTION LIMITS		
Are results reported for all requested analyses? Yes	No	N/A
Are all results supported in the raw data? Yes	No	(N/A)
Are results calculated properly? Yes	No	(N/A)
Do results meet the CRDLs? Yes	No	N/A
Comments:		

U.S. EPA - CLP

6A MATRIX SPIKE DUPLICATES

EPA SAMPLE NO.

BONKT3S

Lab Name: QUANTERRA MO

Contract: 550.231

Lab Code: ITMO Case No.:

SAS No.: SDG No.: W02330

Matrix (soil/water): SOIL

Level (low/med): LOW

% Solids: 98.6

Percent recoveries:

	Control	Motorius		Mahada Gadaa				<u> </u>
Analyte	Control Limit	Matrix Spike (S)		Matrix Spike Duplicate (SD)		RPD	Q	М
As	20%	95.70	-	97.30_	<u>- </u>	1.7_		P
Ba	20%	96.00	-	97.10	-	1.1		P - P -
Cr_Pb	20%	95.20	-	96.10 88.90	_ _	0.9		p P
Hg	20%	122.30	_	121.30 92.50	_	1.4 0.8 2.6	1 1:1 1	C▼!
Ag		90.10		92.50_				P
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U.S. EPA - CLP

5A SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

Arsenic 80-120 194.0974 0.1927 0 202.84 95.7 P Barium 80-120 202.4513 220.0467 202.84 -8.7 N P Cadmium 80-120 4.8651 0.0609 0 5.07 96.0 P Chromium 80-120 19.4655 0.1623 B 20.28 95.2 P Lead 80-120 48.6197 4.1704 50.71 87.7 P Mercury 80-120 0.2079 0.0169 0 0.17 122.3 N CV	ab Name:	QUANTERRA	OM		Cont	ract:	55	0.231	B	ONKT3S		
Concentration Units (ug/L or mg/kg dry weight): MG/KG	ab Code:	ITMO	Case No.: _		SAS No.	•		SDG No.	: W	02330		
Control Limit Spiked Sample Result (SSR) C Result (SR) C Added (SA) & R Q M Sample Result (SSR) C Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (SR) C Spike Result (SR) C Added (SA) & R Q M Sample Result (SR) C Spike Result (atrix (so	il/water	: SOIL_					Level (low	/med): I	JOV	<u></u>
Analyte	Solids for	or Sample	≘: _98.6									
Analyte		Concenti	ration Unit	s (ug/L	or mg/kg	dry w	wei	ght): MG/	KG			
Barium 80-120 202.4513 220.0467 202.84 -8.7 N P Cadmium 80-120 4.8651 0.0609 0 5.07 96.0 P Chromium 80-120 19.4655 0.1623 20.28 95.2 P Lead 80-120 48.6197 4.1704 50.71 87.7 P Mercury 80-120 0.2079 0.0169 0.0169 0 0.17 122.3 N CV	Analyte	Limit	Spiked Sar Result (S	mple SSR) C	Sample Result	⇒ (SR)	С	Spike Added (S	A)	%R	Q	м
	Lead	80-120 80-120 80-120 80-120 80-120	202.4 4.8 19.4 48.6	4513 - 8651 - 4655 - 6197 - 2079 -		.0467 .0609 .1623 .1704	U B	202. 5. 20. 50.	84 07 28 71	-8.7 96.0 95.2 87.7 122.3	_	P P P C

3 BLANKS

ab	Name:	QUANTERRA_MO	Contract:	550.231	
ab	Code:	ITMO Case No.:	SAS No.:	SDG No.: W02330	-
rer	paratio	on Blank Matrix (soil/wate:	r): SOIL_		

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	С	Conti 1	nı B] C	uing Calibr Lank (ug/L) 2	at C	ion 3	С	Prepa- ration Blank	С	М
Arsenic	1.9 1.1 1.0 1.5 1.6 0.1	DBBBBUU	1.0 0.9 1.3 1.2 0.1		1.9 1.0 0.9 1.2 1.4 0.1 0.7		1.9 1.0 0.6 0.8 1.1 0.1 0.7	<u>ה</u> ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה ה	0.060 0.142 0.135 0.017	UUUBBUUU	P P P C P
STIVET		0 1 1	0.7	11111		0		0			
										-	
				- - -		11111				_ _ _	

FORM III - IN

SW-846



MATRIX SPIKE RESULTS

LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

W0426105

MATRIX:

SOIL

				<u> </u>				
ANALYTE	SPIKE Result* Q	COUNTING ERROR (2 s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT		EXPECTED	RECOVERY
HEXCHROME	1.50E+00	N/A	N/A	3.00E-02	mg/kg	3.00E-02	5.00E+00	30.02%

Number of Results: 1



MATRIX SPIKE RESULTS

LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

W042615D

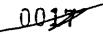
MATRIX:

SOIL

ANALYTE	SPIKE RESULT* Q	COUNTING ERROR (2 s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	SAMPLE RESULT	EXPECTED	RECOVERY
HEXCHROME	1.60E+00	N/A	N/A	3.00E-02	mg/kg	3.00E-02	5.00E+00	32.03%

Number of Results: 1

Quanterra Analytical Services, Inc. rptChemRadMatrixSpike; v3.41



Date:

10 August 1998

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: 100 D Areas - Full Protocol

Subject: Semivolatiles - Data Package No. W02330-QES (SDG No. W02330)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. W02330-QES prepared by Quanterra Environmental Services (QTES). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BONKT3	04/15/98	Soil	С	SVOAs by EPA 8270
BONKT4	04/15/98	Soil	С	SVOAs by EPA 8270
BONKT5	04/15/98	Soil	С	SVOAs by EPA 8270
BONKT6	04/15/98	Soil	С	SVOAs by EPA 8270
BONKT7	04/15/98	Soil	С	SVOAs by EPA 8270
BONKT8	04/15/98	Soil	С	SVOAs by EPA 8270
BONKT9	04/15/98	Soil	С	SVOAs by EPA 8270

Data validation was conducted in accordance with the BHI validation statement of work BHI 1997 and the 100 Area Remedial Action Sampling and Analysis Plan (May 1998). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by greater than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all samples.

Blanks

Method blank analyses are conducted to determine the extent of laboratory contamination introduced through sampling, sample preparation and analysis. At least one acceptable method blank analysis must be conducted for every 20 samples. No contaminants should be present in the method blank. Analytical results for analytes present in any sample at less than five times the concentration of that analyte found in the associated blank are qualified as non-detects and flagged "U". Common laboratory contaminants present in samples at less than ten times the concentration of that analyte found in the associated blank are qualified as non-detects. If a sample result is less than the CRQL and is less than five times (or less than ten times for lab contaminants) the highest associated blank result, the sample result value is raised to the CRQL level and qualified as undetected "U".

All method blank results were acceptable.

Field and Equipment Blanks

One equipment blank (BONKT3) and one field blank (BONKT4) were submitted for analysis. No analytes were detected in the field or equipment blank.

Accuracy

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using five compounds for which percent recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results less than five times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike recovery results were acceptable.

Surrogate Recovery

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. If two surrogates of the same class of compounds (base/neutral or acid) are out of control limits, all associated sample results greater than the CRQL are qualified as estimates and flagged "J". Sample results less than the CRQL and below the lower control limit are qualified as estimates and flagged "UJ". Sample results less than the CRQL with recoveries above the upper control limit require no qualification. If a surrogate recovery is less than 10%, detects are qualified as estimates and flagged "J" and nondetects are rejected and flagged "UR".

All surrogate recovery results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For samples analyzed using SW-846 protocol, results must be within RPD limits of \pm 1 30% for solid samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample

concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate RPD results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No. BONKT5

Duplicate Sample No.

BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against CRQLs to ensure that laboratory detection levels meet the required criteria. The reported detection limit was above the CRQL for samples BONKT6, BONKT7, BONKT8, and BONKT9. All other reported analytical detection limits were at or below CRQLs.

Completeness

Data package No. W02330-QES (SDG No. W02330) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, May 1998.

Appendix 1 Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- N Indicates presumptive evidence of a compound. The data may not be valid for some specific applications usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: W02330	REVIEWER: TLI	DATE: 08/10/98	PAGE_1_OF_1_							
COMMENTS: No qualifiers assigned										
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON							

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANFOR	D			า																							
Laboratory: Quanterra	•			i																							
Case	SDG: V	V02386		1																							
Sample Number		BONKT	3	BONKT4		BONKT	Γ 5	BONKTE		BONKT7	,	BONKT	1	BONKT9		ŀ				T							
Location		1607-D		1607-D2		1607-E	_	1607-D2		1607-D2		1607-D2		1607-D2	:	1											
Remarks				Field Blac				Duplicate							_												
Sample Date		04/15/9		04/15/98		04/15/9	8	04/15/98		04/15/98		04/15/98		04/15/98		<u> </u>											
Semi-volatiles	CRDL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Resu	it Q
bis(2-Ethylhexyl)Phthalete	330	33	30 U	330			30 U	340		340	υ	340	υ	400	Ū												
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EPA SAMPLE NO.

BONKT3

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.: SDG No.: W02330

Matrix: (soil/water) SOIL

Lab Sample ID: 17539-001

Sample wt/vol: 30.10 (g/mL) G

Lab File ID: A1647

Level: (low/med) LOW

Date Received: 04/15/98

% Moisture: 1 decanted: (Y/N) N

Date Extracted: 04/21/98

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 04/21/98

Injection Volume: 2.0(uL)

Dilution Factor:

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

117-81-7-----bis(2-Ethylhexyl)Phthalate__ 330

3/90

EPA SAMPLE NO.

BONKT4

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.:

(uL)

SDG No.: W02330

Matrix: (soil/water) SOIL

Lab Sample ID: 17539-002

Sample wt/vol: 30.10 (g/mL) G

Lab File ID: A1650

Date Received: 04/15/98

Level: (low/med) LOW

% Moisture:

Concentrated Extract Volume: 1000

0 decanted: (Y/N) N Date Extracted: 04/21/98

Date Analyzed: 04/21/98

Injection Volume: 2.0(uL)

CAS NO.

Dilution Factor:

1.0

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

Q

117-81-7-----bis(2-Ethylhexyl)Phthalate

COMPOUND

330

U

MW 11/98

FORM I SV-2

3/90

EPA SAMPLE NO.

BONKT5

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.:

SDG No.: W02330

Matrix: (soil/water) SOIL

Lab Sample ID: 17539-003

Sample wt/vol: 30.00 (g/mL) G

Lab File ID: A1651

Level: (low/med) LOW

Date Received: 04/15/98

% Moisture:

1 decanted: (Y/N) N Date Extracted: 04/21/98

Concentrated Extract Volume: 1000

(uL)

Date Analyzed: 04/21/98

Injection Volume: 2.0(uL)

Dilution Factor:

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

Q

117-81-7-----bis(2-Ethylhexyl)Phthalate_

330

U

11/97

FORM I SV-2

3/90

EPA SAMPLE NO.

BONKT6

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.:

SDG No.: W02330

Matrix: (soil/water) SOIL

Lab Sample ID: 17539-004

Sample wt/vol: 30.10 (g/mL) G

Lab File ID: A1652

Level: (low/med) LOW

Date Received: 04/15/98

: ,

% Moisture: 2 decanted: (Y/N) N Date Extracted: 04/21/98

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 04/21/98

Injection Volume: 2.0(uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS:

Q

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

117-81-7-----bis(2-Ethylhexyl)Phthalate

340

Ū

FORM I SV-2

3/90

EPA SAMPLE NO.

BONKT7

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.:

SDG No.: W02330

Matrix: (soil/water) SOIL

Lab Sample ID: 17539-005

Sample wt/vol:

30.10 (g/mL) G

Lab File ID: A1653

Level: (low/med) LOW

Date Received: 04/15/98

% Moisture:

2 decanted: (Y/N) N Date Extracted: 04/21/98

Concentrated Extract Volume: 1000

(uL)

Date Analyzed: 04/22/98

Injection Volume: 2.0(uL)

CAS NO.

COMPOUND

Dilution Factor:

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

Q

117-81-7-----bis(2-Ethylhexyl)Phthalate_

340

U

Al-1/58

3/90

EPA SAMPLE NO.

BONKT8

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.:

SDG No.: W02330

Matrix: (soil/water) SOIL

Lab Sample ID: 17539-006

Sample wt/vol: 30.10 (g/mL) G

Lab File ID: A1654

Level: (low/med) LOW

Date Received: 04/15/98

% Moisture: 3 decanted: (Y/N) N Date Extracted: 04/21/98

Concentrated Extract Volume: 1000

(uL)

Date Analyzed: 04/22/98

Injection Volume: 2.0(uL)

CAS NO.

Dilution Factor:

1.0

GPC Cleanup: (Y/N) N

pH:

CONCENTRATION UNITS:

(ug/L or ug/Kg) UG/KG

Q

117-81-7-----bis (2-Ethylhexyl) Phthalate

COMPOUND

340

U

pre 17/98

FORM I SV-2

3/90

EPA SAMPLE NO.

BONKT9

Lab Name: QUANTERRA MO

Contract: 550-231

Lab Code: ITMO Case No.: S53901 SAS No.:

SDG No.: W02330

Matrix: (soil/water) SOIL

' Lab Sample ID: 17539-007

Sample wt/vol:

30.10 (g/mL) G

Lab File ID: A1655

Level: (low/med) LOW

Date Received: 04/15/98

% Moisture:

18 decanted: (Y/N) N Date Extracted: 04/21/98

Concentrated Extract Volume: 1000

(uL) Date Analyzed: 04/22/98

Injection Volume: 2.0(uL)

Dilution Factor:

1.0

GPC Cleanup: (Y/N) N pH:

CONCENTRATION UNITS:

CAS NO.

COMPOUND

(ug/L or ug/Kg) UG/KG

117-81-7-----bis(2-Ethylhexyl)Phthalate___

400

U

08/1/98

FORM I SV-2

3/90

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



Quanterra Incorporated 13715 Rider Trail North Earth City, Missouri 63045

314 298-8566 Telephone 314 298-8757 Fax

CASE NARRATIVE

Bechtel Hanford Incorporated 3350 George Washington Way Richland, Washington 99352

May 28, 1998

Attention: Joan Kessner

one:

550.231

Project Number :

SDG : W02330 Number of Samples : Seven (7)

Sample Matrix : Soil

Data Deliverable : Summary

Date SDG Closed : April 15, 1998

II. Introduction

On April 15, 1998, seven (7) "soil" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. There are no comments or nonconformances associated with the shipping and receiving of these samples. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

St. Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
17539-001	B0NKT3	80426001	Soil	15-APR-98
17539-002	B0NKT4	80426002	Soil	15-APR-98
17539-003	BONKT5	80426003	Soil	15-APR-98
17539-004	B0NKT6	80426004	Soil	15-APR-98
17539-005	B0NKT7	80426005	Soil	15-APR-98
17539-006	BONKT8	80426006	Soil	15-APR-98
17539-007	B0NKT9	80426007	Soil	15-APR-98





Bechtel Hanford Incorporated

May 28, 1998

Project Number: 550.231

SDG: W02330

Page 2

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested:

ICP Metals by EPA method 6010 (Supertrace){Arsenic, Barium,

Cadmium, Chromium, Lead, Silver

Mercury by EPA method 7471 Pest/PCBs by EPA method 8080

Semi-Volatiles by EPA method 8270 (TCL) {Bis(2-ethylhexyl

phthalate}

Deviation from Request:

No Deviation from requested methods.

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

QCBLK-

Quality Control Blank, Method Blank

QCLCS-

Quality Control Laboratory Control Sample, Blank Spike

MS-

Matrix Spike

MSD-

Matrix Spike Duplicate

V. Comments

General:

No general comments were noted.

Inorganics:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix

Spike Duplicate were analyzed with each preparation batch per the

protocol for this analysis.



Bechtel Hanford Incorporated

May 28, 1998

Project Number: 550.231

SDG: W02330

Page 3

Inorganics: (cont.)

The recoveries of the matrix spike and the matrix spike duplicate for the following list of elements were not within the 80%-120% range, therefore all associated data was flagged with a "N".

	% REC	% REC		
Barium	0	0		
Mercury	122.3	121.3		

Pest/PCBs:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

No problems were noted during the analyses of these samples.

Semi-VOA:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

No problems were noted during the analyses of these samples.

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Robert E. White Project Manager

Bechtel H	anford Inc.	1	CIIA	IN OF CUSTOL)Y/SAM	PLE AN	NALYSI	S REQU	JEST			B98-022-1	1 Jage	1 4 1
Collector Mike Stankovich / 3RYH~+			ompany,Contact 'Cary Hamilton	ontact Telephone No. ilton 531-0731					Project Coordinator KOERNER, CC			Data Turnaround		
'roject Designation 100 D Areas - Full Protocol			3	Sampling Location 1607-D2					SAF No. B98-022			o Days	<i>i</i> 	
ce Chest No.			F	Field Logbook No. EL-1339-2 Hethod of Shipmen El-1339-2 Hand Delivery - C							nt Government Vehicle			
hipped To Quanterra Incorporated			Ü	Ifale Property No. N/A		-	H,		Bill of Ladi N/A	ng/Air Mili i	No.			
OSSIBLE SAMPLE HAZARBEREMARKS				Preservation	Plume	Coul 4C	Home	Name	Heas	Cool 4C	Coal 4C	Phone		
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ABORATORY SECTION	leceived By				Title							Date/Ti	Me	· ·
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Collector Mike Stankovich / 13 R Te		C	ompany Contact Gay Hamilton	Tele;	phone No. 1-0731			Project Coa KOERNI	rdinator II, CC		ala Turnarou		
Project Designation 100 D Arem - Full Protocol			Sampling Location 1607-D2				SAF No. B98-022			15 Days			
re Chest No.			icid Logbook No. EL-1339-2					Method of 2 Hand Del	Shipment livery - Gove	ernment V	ehicle		
hipped Te Quanterra incorporated			Mile Property No. N/A		:	1		Bill of Ladi N/A	ng/Air Bill	No.			
OSSIBLE SAMPLE HAZAR	DS/REMARKS		Preservation	Hone	Cool 4C	None	None	None	Cool 4C	Cool 4C	None		1
		ľ	Type of Container		aG	*C	•0	øG.	øQ.	■G	P		
•	•	ľ	No. of Container(s)	,	1	1			1		7		1
pecial Handling and/or Stora	ls.		Volume	20ml	60m2	60ml	60ml	60ml	(20ml	120m1	1000mi		
	SAMPLE A	NALYSIS		Anthrity Boss	Chromium Hor • 7196	Astericken- 241; feetopie Photonium; leetopie Uranjum	See have (1) in Special Instructions.	Marany - 1471 - (CV)	P. offClie - cose (TCL)	Semi-VOA 8270A (TC (Bin(2 ₀ sthytheryt phthelete	L) Special Instructions.		
8042					804	261					804261		
Sample No.	Matrix *	Sample Date	Sample Time		X		. y 51	×6	62			4	
ONKT7 05	Soll	4-13-18	 	Y			/ Y /		× 8°c	148	Y Y	AY	15
ONKT8 OG	Soil	4-10 -18	0915	K	X	*	/ X 60	× 60		 / 	 	A3	166
DANCETS 07	Soll	4-15-98	0930	×	7	<u> </u>		K.6.	- ` \ }	\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	4-3-	AI	137
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<u> </u>		<u> </u>					1/00	100					
2		<u> </u>											-
		Sign/Print Na			SPECIAL I	NSTRUCTI	ONS	· 				1	viatrix *
CHAIN OF POSSESSION	1350 5198	(1) ICP Motels - 6010A (Supertrace) (Arsonic, Barlum, Carlenium, Chrymium, Lead, Silver)							S - Soff 3th - Sediment SO - Solide SL - Sludge W - Water O - Oil A - Air D3 - Dram Solide				
Inquished By	Date/Time	Received By	Dete/Tie	10			`					T	- Drum Liquids - Tissue - Wipe
Registed By	Date/Time	Resolved By	Date/Tie	NO.								L ;	- Liquid - Vegetation - Other
ABORATORY Resided By				Title				-			Date/[1	niet.	
SECTION INAL SAMPLE Disposed Mar	And					Disposed By	,				Date/Ti	me	
ISPOSITION													

Appendix 5

Data Validation Supporting Documentation

GC/MS ORGANIC DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	© 1	D	E					
PROJECT: 10	O D areas		DATA PACKAGE	: W0233	٥					
VALIDATOR:		LAB:	DATE: C/Y/E8							
CASE:			SDG: Wo2	_330						
		ANALYSES	PERFORMED							
CLP Volatiles SW-846 8240 SW-846 8280 CLP Semivolatiles (dap column)				Gap column)	SW-846 (packed column)					
SAMPLES/MATE	₹IX									
RONK	73 Bo	UKT4	BONKTS	BONKT	ر :					
BONK		ONKTY	BONKT9							
•				•						
		_								
1. DATA PACK	CAGE COMPLETEN	NESS AND CASE	NARRATIVE							
	verification		*		Yes No N/A					
	rrative preser		-		res No N/A					
Comments:	-									
			· ·		<u></u>					
					· · · · · · · · · · · · · · · · · · ·					
2. HOLDING										
Are sample he	olding times	acceptable?		(Yes No N/A					
Comments:		j-		••						
			,	•						
			*****	···						
				·						
			<u> </u>							

GC/MS ORGANIC DATA VALIDATION CHECKLIST

[連引

3. INSTRUMENT TUNING AND CALIBRATION		\bigcirc
Is the GC/MS tuning/performance check acceptable? Yes	No	N/A
Are initial calibrations acceptable? Yes	No	N/A
Are continuing calibrations acceptable? Yes	No	N/A
Comments:		$\overline{\mathcal{L}}$
		
4. BLANKS		
Were laboratory blanks analyzed?	No	N/A
Are laboratory blank results acceptable? Yes	No	N/A
Were field/trip blanks analyzed?	No	NHAM
Are field/trip blank results acceptable? Yes	No	(MA)
Comments:		
5. ACCURACY Were surrogates/System Monitoring Compounds analyzed? Yes Are surrogate/System Monitoring Compound recoveries acceptable? Yes Were MS/MSD samples analyzed? Yes	No No No	N/A N/A N/A
Are MS/MSD results acceptable?	No	N/A
Comments:	-	
		
		
		

GC/MS ORGANIC DATA VALIDATION CHECKLIST

6. PRECISION	
Are MS/MSD RPD values acceptable?	No NA
Are field duplicate RPD values acceptable?	No No
Are field split RPD values acceptable? Yes	No NA
Comments:	
	
7. SYSTEM PERFORMANCE	
Were internal standards analyzed? Yes	No / N/A
Are internal standard areas acceptable? Yes	No N/A
Are internal standard retention times acceptable? Yes	No N/A
Comments:	
	·
8. COMPOUND IDENTIFICATION AND QUANTITATION	
Is compound identification acceptable? Yes	No (/ N/A
Is compound quantitation acceptable? Yes	No \ N/A/
Comments:	
· · · · · · · · · · · · · · · · · · ·	
9. REPORTED RESULTS AND QUANTITATION LIMITS	
Are results reported for all requested analyses? Yes	No N/A
Are all results supported in the raw data? Yes	No NA
Do results meet the CRQLs?	No N/A
Has the laboratory properly identified and coded all TIC? Yes	No AVA
Comments: The quantum of the comments of the c	

Date:

10 August 1998

To:

Bechtel Hanford Inc. (technical representative)

From:

TechLaw, Inc.

Project: 100 D Areas - Full Protocol

Subject: Pesticide/PCB - Data Package No. W02330-QES (SDG No. W02330)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. W02330-QES prepared by Quanterra Environmental Services (QES). A list of the samples validated along with the analyses reported and the method of analysis is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis -
BONKT3	04/15/98	Soil	С	Pest/PCBs by EPA 8080
BONKT4	04/15/98	Soil	C .	Pest/PCBs by EPA 8080
BONKT5	04/15/98	Soil	С	Pest/PCBs by EPA 8080
BONKT6	04/15/98	Soil	С	Pest/PCBs by EPA 8080
BONKT7	04/15/98	Soil	С	Pest/PCBs by EPA 8080
BONKT8	04/15/98	Soil	С	Pest/PCBs by EPA 8080
BONKT9	04/15/98	Soil	С	Pest/PCBs by EPA 8080

Data validation was conducted in accordance with the BHI validation statement of work (BHI 1997) and the 100 Area Remedial Action Sampling and Analysis Plan (May 1998). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded by less than two times the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by greater than two times the limit, all associated detected sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all samples.

Blanks

Method blank analyses are performed to determine the extent of laboratory contamination introduced through sampling, sample preparation or analysis. At least one method blank analysis must be conducted for every 20 samples. Method blanks should not contain target compounds at a concentration greater than the CRQL. If target compounds are present, sample results less than five times the blank concentration are qualified as nondetects and flagged "U". If the sample result is less than five times the blank concentration and less than CRQL, the result is qualified as a nondetect, elevated to the CRQL and flagged "U".

All method blank target compound results were acceptable.

Field and Equipment Blanks

One equipment blank (BONKT3) and one field blank (BONKT4) were submitted for analysis. No analytes were detected in the field or equipment blank.

Accuracy

Matrix Spike/Matrix Spike Duplicate Recoveries

Matrix spike/matrix spike duplicate analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike/matrix spike duplicate analyses are performed in duplicate using six compounds and must be within the

established laboratory quality control limits of 70-130 percent. If spike recoveries are outside control limits, detected sample results less than 5 times the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results greater than five times the spike concentration require no qualification.

All matrix spike/matrix spike duplicate recovery results were acceptable.

Surrogate Recovery

The analysis of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is outside the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Nondetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Undetected compounds with surrogate recoveries above the upper control limit require no qualification.

All surrogate recovery results were acceptable.

Precision

Matrix Spike/Matrix Spike Duplicate Samples

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed as the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Results must be within RPD limits of \pm 30% for soil samples. If RPD values are out of specification and the sample concentration is less than five times the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate RPD results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No.

Duplicate Sample No.

BONKT5

BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Detection Levels

Reported laboratory detection levels are compared against CRQLs to ensure that laboratory detection levels meet the required criteria. The reported analytical detection level for toxaphene was above the CRQL in all samples. Under the BHI statement of work, no qualification is required. All other reported detection levels were at or below the CRQL.

Completeness

Data Package No. W02330-QES (SDG No.W02330) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, May 1998.

Appendix 1 Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI validation SOW are as follows:

- Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the sample quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- Indicates the compound or analyte was analyzed for and detected. The associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ Indicates presumptive evidence of a compound at an estimated value.

 The data may not be valid for some specific applications (i.e., usable for decision-making purposes).
- Indicates presumptive evidence of a compound. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: W02330	REVIEWER: TLI	DATE: 08/10/98	PAGE_1_OF_1_
COMMENTS: No qualifiers	assigned		
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
			

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

Project: BECHTEL-HANF	ORD		7										•											
Laboratory: Quanterra			7																					
Case	SDG: W	/02386	7																					
Sample Number		BONKT3	B0NKT4		BONKT5	BONKT6	1	BONKT7	П	BONKT8		BONKT9	1										T	
Location		1607-D2	1607-D2		1607-D2	1607-D2	1	1607-D2	7	1607-D2		1607-D2									<u> </u>			
Remarks		Equip. Blant	Field Blank	k		Duplicate	Т		Т			· · · · · · · · · · · · · · · · · · ·	1		1									
Sample Date		04/15/98	04/15/98		04/15/98	04/15/98	0	4/15/98	0	4/15/98		04/15/98	1	V	1									
Pest/PCB	CRDL	Result Q	Result	Q	Result Q	Result Q	R	Result C) R	Result (Q	Result Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	a	Result	ı Q
alpha-BHC	50	1.7 U	1.7	C	1.7 U	1.7 U		1.7 U	J	1.7	U	2 U						Ì		Т				丁
beta-BHC	50	1.7 U	1.7	U	1.7 U	1.7 U		1.7 U		1.7	Ū	2 Ų				Г		Г	1	Τ		1		
delta-BHC	50	1.7 U	1.7	U	1.7 U	1.7 U		1.7 U	Л	1.7	Ų	2 U		Т		Τ		Г		T	1	Т	Ì	\neg
gamma-BHC (Lindane)	50	1.7 U			1.7 U	1.7 U	$oldsymbol{oldsymbol{oldsymbol{oldsymbol{I}}}$	1.7 U		1.7	U	2 U						Π	I	Т		T		
Heptachlor	50	1.7 U	1.7	U	1.7 U	1.7 U	$oldsymbol{\mathbb{L}}$	1.7 U	ı	1.7	Ų	2 U						L						\top
Aldrin	50	1.7 U	1.7	U	1.7 U	1.7 U	Ι	1.7 U	ıΤ	1.7	U	2 U												\top
Heptachlor epoxide	50	1.7 U	1.7	U	1.7 U	1.7 U		1.7 U	лŢ	1.7	U	2 U								Τ		Т		\top
Endosulfan I	50	1.7 U	1.7	U	1.7 U	1.7 U	Т	1.7 U	л	1.7	U	2 U						Г		Т		П		
Dieldrin	50	1.7 Ú	1.7	U	1.7 U	1.7 U	Т	1.7 U	,	1.7	Ū	2 U				Т		П		T		T		
4,4'-DDE	50	1.7 U	1.7	U	1.7 U	1.7 U	1	1.7 U	л	1.7	U	2 U				Т		Г		T		T	—	
Endrin	50	1.7 U	1.7	U	1.7 U	1.7 U	T	1.7 U	丌	1.7	IJ	2 U												\Box
Endosulfan #	50	1.7 U	1.7	U	1.7 U	1.7 U		1.7 U	П	1.7	U	2 U					I	Π						\neg
4,4'-000	50	1.7 U	1.7	U	1.7 U	1.7 U	Т	1.7 U		1.7	Ū	2 U				Γ								\Box
Endosulfan aulfate	50	1.7 U	1.7	U	1.7 U	1.7 U	T	1.7 U	1	1.7	J	2 U												
4,4'-DDT	50	1.7 U	1.7	U	1.7 U	1.7 U	Т	1.7 U	1	1.7 l		2 U												
Methoxychlor	50	3.3 U	3.3	v	3.3 U	3.4 U		3.4 U	ı	3.4 l	J	4 U												
Endrin Aldehyde	50	1.7 U	1.7	U	1.7 U	1.7 U		1.7 U		1.7 U	J	2 U	Ī			L								
Tech. Chlordane	50	17 U	17	Ü	17 U	17 U		17 U		17 (J	20 U												
Toxaphene	50	67 U	66	υ	67 U	68 U		68 U		68 l	J	81 U				L								
Aroclor-1221	50	34 U	33	U	33 U	34 U		34 U		34 (J	40 U	1					L	İ					
Aroclor-1232	50	34 U	33	υ	33 U	34 U	\perp	34 U	ıΙ	34 (40 U	1											
Arocior-1016/1242	50	34 U	33	U	33 U	34 U		34 U		34 (40 U												
Arocior-1248	50	34 U	33	υ	33 U	34 U	\mathbf{I}	34 U	_	34 (40 U				匚								
Arocior-1254	50	34 U	. 33	υŢ	33 U	34 U	\mathbf{I}	34 U	_	34 (J	40 U	<u> </u>		1					L				
Aroclor-1260	50	34 U	33	U	33 U	34 U	\perp	34 U	<u>. </u>	34 (J	40 U				$oxedsymbol{oxed}$		L						丄
				\Box			Ι		$oldsymbol{oldsymbol{oldsymbol{oldsymbol{\Box}}}$															
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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: <u>OUANTERRA, MO</u> Contract:	550.231	BONKT3
Lab Code: ITMO Case No.: SAS No.:	SDG No.:	W02330
Matrix: (soil/water)SOIL	Lab Sample ID:	17539-001
Sample wt/vol: <u>30.1</u> (g/ml) <u>G</u>	Lab File ID:	
Level: (low/med) <u>LOW</u>	Date Sampled :	04-15-98
% Moisture: not dec dec	Date Extracted:	04-21-98
Extraction: (SepF/Cont/Sonc) SONC	Date Analyzed:	04-22-98
GPC Cleanup: (Y/N) N pH:	Dilution Factor:	1
CAS NO. Compound (ug/L	TRATION UNITS: or ug/Kg) <u>UG/KG</u>	Q
319-84-6	1.7	

U: Concentration of analyte is less than the value given.

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1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: <u>QUANTERRA,MO</u> Contract:	550.231	BONKT5
Lab Code: ITMO Case No.: SAS No.:	SDG No.:	
Matrix: (soil/water)SOIL	Lab Sample ID:	17539-003
Sample wt/vol: <u>30.1</u> (g/ml) <u>G</u>	Lab File ID:	
Level: (low/med) LOW	Date Sampled :	04-15-98
% Moisture: not dec dec	Date Extracted:	04-21-98
Extraction: (SepF/Cont/Sonc) SONC	Date Analyzed:	04-22-98
GPC Cleanup: (Y/N) N pH:	Dilution Factor:	1
	TRATION UNITS: or ug/Kg) <u>UG/KG</u>	Q
319-84-6	1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7	

U: Concentration of analyte is less than the value given.

FORM I PEST

1/87 Rev.

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1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: <u>OUANTERRA,MO</u> Contrac	t:BONKT6
Lab Code: <u>ITMO</u> Case No.:	SAS No.: SDG No.:
Matrix: (soil/water)SOIL	Lab Sample ID:17539-004
Sample wt/vol: 30.1 (g/ml) G	Lab File ID:
Level: (low/med) LOW_	Date Sampled : 04-15-98
% Moisture: not dec2 dec	Date Extracted: 04-21-98
Extraction: (SepF/Cont/Sonc) _	SONC Date Analyzed: 04-22-98
GPC Cleanup: (Y/N) <u>N</u> pH: _	Dilution Factor:1
CAS NO. Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG Q
319-84-6	1.7

U: Concentration of analyte is less than the value given.

FORM I PEST

1/87 Rev.

200065

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: <u>QUANTERRA,MO</u> Contract:	550.231	BONKT7
Lab Code: ITMO Case No.: SAS No.:	SDG No.:	W02330
Matrix: (soil/water) <u>SOIL</u>	Lab Sample ID:	17539-005
Sample wt/vol: <u>30.1</u> (g/ml) <u>G</u>	Lab File ID:	
Level: (low/med) LOW	Date Sampled :	04-15-98
% Moisture: not dec. 2 dec	Date Extracted:	04-21-98
Extraction: (SepF/Cont/Sonc) SONC	Date Analyzed:	04-22-98
GPC Cleanup: (Y/N) N pH:	Dilution Factor:	1
	RATION UNITS: or ug/Kg) <u>UG/KG</u>	Q
319-84-6	1.7	

U: Concentration of analyte is less than the value given.

FORM I PEST

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1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: <u>QUANTERRA,MO</u> Contract:	550.231	BONKT8
Lab Code: <u>ITMO</u> Case No.:	SAS No.: SDG No.:	w02330
Matrix: (soil/water) SOIL	Lab Sample ID:	17539-006
Sample wt/vol: 30.2 (g/ml) G	Lab File ID:	···
Level: (low/med) LOW	Date Sampled :	04-15-98
% Moisture: not dec3 dec	Date Extracted:	04-21-98
Extraction: (SepF/Cont/Sonc) SONC	Date Analyzed:	04-22-98
GPC Cleanup: (Y/N) N pH:	Dilution Factor:	1
CAS NO. Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	Ω
319-84-6	1 . 7 1	

U: Concentration of analyte is less than the value given.

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1D PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: <u>QUANTERRA,MO</u> Contract:	550.231 BONKT9
Lab Code: ITMO Case No.:	SAS No.: SDG No.:W02330
Matrix: (soil/water)SOIL	Lab Sample ID: <u>17539-007</u>
Sample wt/vol: <u>30.0</u> (g/ml) <u>G</u>	Lab File ID:
Level: (low/med) LOW	Date Sampled :04-15-98
% Moisture: not dec dec	Date Extracted: 04-21-98
Extraction: (SepF/Cont/Sonc) SONC	Date Analyzed: 04-22-98
GPC Cleanup: (Y/N) N pH:	Dilution Factor: 1
CAS NO. Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG Q
319-84-6	

U: Concentration of analyte is less than the value given.

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Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation

8/1/98



RECEIVED

Data Log In

5056181TT

Quanterra Incorporated 13715 Rider Trail North Earth City, Missouri 63045

314 298-8566 Telephone 314 298-8757 Fax

CASE NARRATIVE

Bechtel Hanford Incorporated 3350 George Washington Way Richland, Washington 99352

May 28, 1998

Attention: Joan Kessner

Dali Ressilei

Project Number

550.231

SDG

W02330 Seven (7)

Number of Samples Sample Matrix

Soil

Data Deliverable

Summary

Date SDG Closed

April 15, 1998

II. Introduction

On April 15, 1998, seven (7) "soil" samples were received by Quanterra, Richland and transferred to Quanterra, St. Louis for chemical analysis. There are no comments or nonconformances associated with the shipping and receiving of these samples. Upon receipt, the samples were given the following laboratory ID numbers to correspond with the specific client ID's:

St. Louis ID	BHI ID	Richland ID	Matrix	Date of Receipt
17539-001	B0NKT3	80426001	Soil	15-APR-98
17539-002	BONKT4	80426002	Soil	15-APR-98
17539-003	BONKT5	80426003	Soil	15-APR-98
17539-004	BONKT6	80426004	Soil	15-APR-98
17539-005	BONKT7	80426005	Soil	15-APR-98
17539-006	BONKT8	80426006	Soil	15-APR-98
17539-007	BONKT9	80426007	Soil	15-APR-98

8/1/28



Bechtel Hanford Incorporated

May 28, 1998

Project Number: 550.231

SDG: W02330

Page 2

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits.

Analyses requested:

ICP Metals by EPA method 6010 (Supertrace) {Arsenic, Barium,

Cadmium, Chromium, Lead, Silver} Mercury by EPA method 7471

Pest/PCBs by EPA method 8080

Semi-Volatiles by EPA method 8270 (TCL) {Bis(2-ethylhexyl

phthalate}

Deviation from Request:

No Deviation from requested methods.

IV. Definitions

The following codes are used to denote laboratory quality control samples and can be found in the data summary section of this report:

OCBLK-

Quality Control Blank, Method Blank

QCLCS-

Quality Control Laboratory Control Sample, Blank Spike

MS-

Matrix Spike

MSD-

Matrix Spike Duplicate

V. Comments

General:

No general comments were noted.

Inorganics:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix

Spike Duplicate were analyzed with each preparation batch per the

protocol for this analysis.

8/1/98



Bechtel Hanford Incorporated

May 28, 1998

Project Number: 550.231

SDG: W02330

Page 3

Inorganics: (cont.)

The recoveries of the matrix spike and the matrix spike duplicate for the following list of elements were not within the 80%-120% range, therefore all associated data was flagged with a "N".

	% REC	% REC
Barium	0	0
Mercury	122.3	121.3

Pest/PCBs:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

No problems were noted during the analyses of these samples.

Semi-VOA:

A Laboratory Control Sample, Method Blank, Matrix Spike and Matrix Spike Duplicate were analyzed with each preparation batch per the protocol for this analysis.

No problems were noted during the analyses of these samples.

I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Robert E. White Project Manager r

Bechte	el Hanford I	nc.	CHA	in of custoi)Y/SAM	PLE A	NALYSI	S REQI	UEST			B98-022-1	l l'age	1 10 1
Collector Mike Stankov	ich/BRYH	~ 		ompany,Contact 'Gary Hamilton	Tele 5	phone No. 11-0731		-	Project Cac KOERNI		n	ata Turaaron		
Project Designa 100 D Areas -	(lón		3	empling Location 1607-D2			•		SAF Ne. 898-022	· · · · · · · · · · · · · · · · · · ·		1:	5 Days	5
ice Chest No.			F	ield Logbook No. EL-1339-2		-			Method of S	Shipment livery - Gove	mment V	ehicle		
Shipped To Quarterra inc	orparated		· · ·	Male Property No. N/A		· · · · · · · · · · · · · · · · · · ·	-		the I To IIIII	ng/Air Bill N	ła.		,	
POSSIBLE SAI	MFLE HARARI	DEVERMANKE		Preservation	Mune	Coul 4C	Ness	Mune	None	CS-24C	Coul 40	Hene		T
		•	[Type of Container	P	Da	Đ¢.	aG.	-60	10	9G	,		
		•		No. of Container(s)	1		1	1	1	1	1	2		1
Special Handila	g and/or Storag	le.		Volume	20ml	60ml	60ml	60ml	60ml	120ml	120ml	1000ml		1
	م بر م	SAMPLE A	NALYBIS // Y	12330	Anti-hiy Scan	Chrombin Hex - 7190	Americhun- 241; Intenția Plutenium; Intenția Uranium	See Item (1) in Special Instructions.	1471 · (ČV)	PunPCRe - 1000 (TCL)	Bool-VOA (Bir(2- othythexy(phtheless)	Special Sattractions.		
Sample	80421	Matrix *	Sample Date	Sample Time		804	261				_	804261	-	
BONKT3	01	Soil	4-11-58	0805	×	· C	K		8	11 90	1 4 8	2	Equip	
IONKT4	02	Soil	4-15-78	0 820	×		<u> </u>	/ X	120	/× 1	1 1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	6.4	1 2
IONKTS	03	- Soil		0845	×	<u> </u>	×	100	1.460	1 - V	/X-	X	42	1 3
	04	Soll	4-15-98		×	×	×	1	28	H2 11	定	12	72	17
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Effectation By		Date/Time	Received By	Duto/Tim				٠.						Druss Solids Druss Liquids Tissue
elinquished By		Date/Time	Received By	Date/Tim	18								٧ -	• Wipa • Liquid • Vegetation • Other
LABORATOR BECTION	Y' Received By				Tide							Date/Ti	<u>l</u>	
FINAL SAMPL DISPOSITION		hod					Disposed By			*		Date/Ti	pag .	

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Collector Mike Stankovich / 1.3 R Tra - T	172	Ŏ-	Company Coulact Onry Havilton	, Telepi	Telephone No. 531-0731			Project Coordinator Korania, CC	dinator t, C.C		Deta Turnaround	and 15 Days	[-
neffer S - Full		3	Sampling Location 1607-D2				S	SAF No. B96-022			. .	Days	
re Chest No.		E	Field Logbook No. EL-(339-2				<u>-</u>	Method of Shipment Hand Delivery - G	ethod of Shipment Hand Delivery - Government Vehicle	ment Vehl	뽌		
Shipped To Quanterra Incorporated			Offsite Property No. N/A					Bill of Lading/Air Bill No. N/A	KAIr BIII N				
PUSSIBLE SAMPLE HAZARDS/REMARKS	RDS/REMARKS		Preservation	1	\$ FE	1	į	Ĩ	Selec	Coal 40			
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pecial Handling and/or Storage	***		Volume	- E	7800	9	ş		780Z	130ml	7#000E	 -	
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804260	260				408	261					1777178		
Sample No.	Matrix 6	Sample Date	Sample Time								-		
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SAHKT8 OC	70%	4-52-78	1160	×	¥	×	, ×,	34 X	×	×,	×	A3	16
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NAL SAMPLE Disposed Nethon	febod					Disposed By				i	Date/Time	•	
ISPOSITION													

Appendix 5

Data Validation Supporting Documentation

PESTICIDE/PCB DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	A	В	(0)	D	E
PROJECT:	00 D Are	* \	DATA PACKAGE	: W023	30 ·
VALIDATOR:	TLI	LAB: QE	5	DATE: 8/4	198
CASE:			SDG: Wo?	2330	
		ANALYSES	PERFORMED		
☐ CLP3/90	EW-846 8080	□ SW-846 8081	0	0	0
SAMPLES/MA	TRIX				
BOX	JKT3, BO	DUKTY, Q	BONKTS.	BONKT	,
		•	BONKTI		
					
Soil					
1. DATA PA	CKAGE COMPLETE	NESS AND CASE	NARRATIVE		B
Is technica	l verification	documentatio	n present? .	(Yes No N/A
Is a case n	arrative prese	nt?		(Yes No N/
Comments:					
2. HOLDING	TTUES			<u> </u>	<u></u>
-	holding times	accentable?		1	Yes No N/A
•	nording times				
3. INSTRUM	ENT PERFORMANC	E AND CALIBRA	TIONS		
3.1 INSTRU	MENT PERFORMAN	ICE (METHOD 80	080 AND 8081)		
Are DDT ret	ention times a	acceptable .			Yes No N/
Are calibra	tion standard	retention tim	mes acceptable	?	Yes No N/
Are DDT and	endrin breakd	lowns acceptab	ole?		Yes No N
					\ \

AST 000025

PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are DBC retention times acceptable? Yes	No	(N/A)
Is the GC/MS tuning/performance check acceptable? Yes	No	M/b/
Comments:		
<u> </u>	<u></u>	
<u> </u>		
		<u>.</u>
3.2 CALIBRATIONS (METHOD 8080 AND 8081)		
Are EVAL standard calibration factors and %RSD values acceptable? Yes	No	N/A
Are quantitation column calibration factor %RSD values acceptable? Yes	No	N/A
Were the analytical sequence requirements met? Yes	No	N/A
Are continuing calibration %D values acceptable? Yes	No	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $
Comments:		
3.3 INSTRUMENT PERFORMANCE AND INITIAL CALIBRATION (3/90 SOW) Was the initial calibration sequence performed? Yes Was the resolution acceptable in the resolution check mix? . Yes Is resolution acceptable in the PEM, INDA and INDB? Yes Are DDT and Endrin breakdowns acceptable? Yes Are retention times in PEMs and calibration mixes acceptable? Yes Are %RSD values in the PEMs acceptable? Yes	No No No No No	N/A N/A N/A N/A N/A N/A
Comments:		
3.4 CALIBRATION VERIFICATION (3/90 SOW) Were the analytical sequence requirements met? Yes Is resolution acceptable in the PEMs? Yes	No No	N/A N/A
Are initial calibrations acceptable? Yes	No	N/A



PESTICIDE/PCB DATA VALIDATION CHECKLIST

Are retention times acceptable in the PEMs, INDA and INDB mixes? Yes	No /W/A
Are RPD values in the PEMs acceptable? Yes	No N/A
Are the DDT and endrin breakdowns acceptable? Yes	No N/A
Was GPC cleanup performed? Yes	No N/A
Is the GPC calibration check acceptable? Yes	No N/A
Was Florisil cleanup performed? Yes	No N/A
Is the Florisil performance check acceptable? Yes	No N/A
Comments:	
4. BLANKS	·
Were laboratory blanks analyzed? Yes	No N/A
Are laboratory blank results acceptable?	No N/A
Were field/trip blanks analyzed? Yes	No (N/A
Are field/trip blank results acceptable? Yes	No \N/A/
Comments:	
5. ACCURACY	
Were surrogates analyzed?	No N/A
Are surrogate recoveries acceptable?	No N/A
Were MS/MSD samples analyzed? Yes	No N/A
Are MS/MSD results acceptable? Yes	No N/A
Were LCS samples analyzed? Yes	/ / \
Are LCS results acceptable? Yes	
Comments:	

A-7/000027

PESTICIDE/PCB DATA VALIDATION CHECKLIST

/MSD RPD values acceptable? Yes poratory duplicate results acceptable? Yes eld duplicate RPD values acceptable? Yes	No N/A
eld duplicate RPD values acceptable? Yes	.:
·	No N/
eld split RPD values acceptable? Yes	No (N//
ts: 4,4'DDT - undeltot	
STEM PERFORMANCE	
omatographic performance acceptable? Yes	No (N/
•	No N
pound identification acceptable? Yes	No (N/
sults reported for all requested analyses? Yes	No N/ No N/
	STEM PERFORMANCE Omatographic performance acceptable? Yes sitive results resolved acceptably? Yes ts: MPOUND IDENTIFICATION AND QUANTITATION pound identification acceptable? Yes pound quantitation acceptable? Yes ts: PORTED RESULTS AND QUANTITATION LIMITS sults reported for all requested analyses? Yes

Date:

10 August 1998

To:

Bechtel Hanford, Inc. (technical representative)

From:

TechLaw, Inc.

Project:

100 D Area - Full Protocol

Subject: Radiochemistry - Data Package No. W02330-QES (SDG No. W02330)

INTRODUCTION

This memo presents the results of data validation on Summary Data Package No. W02330-QES which was prepared by Quanterra Environmental Services (QES). A list of samples validated along with the analyses reported and the requested analyte is provided in the following table.

Sample ID	Sample Date	Media	Validation	Analysis
BONKT3	04/15/98	Soil	С	See note 1
BONKT4	04/15/98	Soil	С	See note 1
BONKT5	04/15/98	Soil	С	See note 1
BONKT6	04/15/98	Soil	С	See note 1
BONKT7	04/15/98	Soil	С	See note 1
BONKT8	04/15/98	Soil	С	See note 1
вомот9	04/15/98	Soil	С	See note 1

^{1 -} Gamma spectroscopy (RICHR5017), alpha spectroscopy (RICHR5057/5030)

Data validation was conducted in accordance with the BHI validation statement of work (BHI 1997) and the 100 Area Sampling and Analysis Plan (May 1998). Appendices 1 through 5 provide the following information as indicated below:

- Appendix 1. Glossary of Data Reporting Qualifiers
- Appendix 2. Summary of Data Qualification
- Appendix 3. Qualified Data Summary and Annotated Laboratory Reports
- Appendix 4. Laboratory Narrative and Chain-of-Custody Documentation
- Appendix 5. Data Validation Supporting Documentation

DATA QUALITY OBJECTIVES

Holding Times

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for all analytes is 6 months.

All holding times were acceptable.

Blanks

Laboratory Blanks

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers are applied: All positive sample results less than five times the highest blank concentration are qualified as estimates and flagged "J"; sample results below the MDA are elevated to the MDA and qualified as undetected and flagged "U"; sample results above the MDA and greater than five times the highest blank concentration are not qualified.

Due to laboratory blank contamination, plutonium-238 results in samples BONTK3 and BONTK8 were qualified as estimates and flagged "J".

Due to laboratory blank contamination, the negative plutonium-238 result in sample BONTK6 was elevated to the MDA and qualified as undetected "U".

Due to laboratory blank contamination, plutonium-239/240 results in all samples (except BONKT8) were qualfied as estimates and flagged "J".

Due to laboratory blank contamination, radium-224 results in samples BONKT3 and BONKT4 were qualified as estimates and flagged "J".

Due to laboratory blank contamination, radium-226 results in all samples were qualified as estimates and flagged "J".

All other blank results were acceptable.

Field and Equipment Blanks

One equipment blank (BONKT3) and one field blank (BONKT4) were submitted for analysis. The following analytes wre detected in the equipment blank: americium-241 (alpha spec), uranium-234 (alpha spec), uranium-238 (alpha spec), plutonium-238, plutonium-239/240, potassium-40, radium-222, radium-

226, radium-228, and uranium-238 (GEA). The following analytes were detected in the field blank: americium-241 (alpha spec), uranium-234 (alpha spec), uranium-238 (alpha spec), plutonium-239/240, potassium-40, radium-222, radium-224, and radium-228. Under the BHI statement of work, no qualification is required. No other analytes were detected in the field or equipment blank.

Accuracy

Accuracy is evaluated by analyzing distilled water or field samples spiked with known amounts of radionuclides. The sample activity as determined by analysis is compared to the known activity to assess accuracy. The acceptable laboratory control sample recovery range is 70% to 130%, while that for a matrix spike is 70% to 130%. In addition, samples may be spiked with a radiochemical tracer to assist in isolating the radioisotope of interest with the yield of the tracer being used in calculating sample activity. The acceptable range for tracer recovery is 20% to 105%. Spike sample results outside the above ranges result in associated sample results being qualified as estimates, rejected, or not qualified, depending on the activity of the individual sample.

Due to an LCS recovery of 139%, plutonium-239/240 results in all samples were qualified as estimates and flagged "J".

Due to an LCS recovery of 42%, all uranium-238 results were qualified as estimates and flagged "J/UJ".

All other accuracy results were acceptable.

Precision

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. Contol limits are +/- 30% for both soil and water samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to RPDs outside QC limits, all samples results for the following analytes were qualified as estimates and flagged "J/UJ": K-40, Ra-224/226/228.

All other duplicate results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No.

Duplicate Sample No.

BONKT5

BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Detection Levels

Reported laboratory detection levels are reviewed to ensure that they are at or below the contract required MDA. Reported detection levels were above the MDA for U-238 in samples BONKT4, BONKT5, BONKT6, BONKT8, and BONKT9 above for Am-241(GEA) in samples BONKT5, BONKT6, and BONKT9. All other reported MDAs were at or below the analyte-specific CRDL.

Completeness

Data Package No. W02330 (SDG No. W02330) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, plutonium-238 results in samples BONTK3 and BONTK8 were qualified as estimates and flagged "J". Due to laboratory blank contamination, the negative plutonium-238 result in sample BONTK6 was elevated to the MDA and qualified as undetected "U". Due to laboratory blank contamination, plutonium-239/240 results in all samples (except BONKT8) were qualified as estimates and flagged "J". Due to laboratory blank contamination, radium-224 results in samples BONKT3 and BONKT4 were qualified as estimates and flagged "J". Due to laboratory blank contamination, radium-226 results in all samples were qualified as estimates and flagged "J". Due to an LCS recovery of 139%, plutonium-239/240 results in all samples were qualified as estimates and

flagged "J/UJ". Due to an LCS recovery of 42%, all uranium-238 (alpha spec) results were qualified as estimates and flagged "J/UJ". Due to RPDs outside QC limits, all samples results for the following analytes were qualified as estimates and flagged "J/UJ": K-40, Ra-224/226/228. Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

REFERENCES

BHI, MRB-SBB-A23665, Validation Statement of Work, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, May 1998.

Appendix 1 Glossary of Data Reporting Qualifiers

Qualifiers which may be applied by data validators in compliance with the BHI statement of work are as follows:

- Indicates the compound or analyte was analyzed for and not detected above the minimum detectable activity (MDA) in the sample. The value reported is the sample result corrected for sample dilution and moisture content by the laboratory. The data is usable for decision making purposes.
- UJ Indicates the compound or analyte was analyzed for and not detected at concentrations above the minimum detectable activity (MDA) in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate, but is usable for decision making purposes.
- Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- R Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.

Appendix 2
Summary of Data Qualification

DATA QUALIFICATION SUMMARY

SDG: W02330	REVIEWER:	DATE: 08/10/98	PAGE_1_OF_1_	
COMMENTS:				
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON	
Pu-238	J	BONTK3, BONTK8	Blank contamination	
Pu-238	U	BONTK6	Blank contamination	
Pu-239/40	J	BONTK3, BONTK4, BONTK5, BONTK6, BONTK7, BONTK9	Blank . contamination	
Ra-224	J	BONTK3, BONTK4	Blank contamination	
Ra-226	J	All	Blank contamination	
Pu-239/40	1/01	All	LCS recovery	
U-238 (Alpha Spec)	J/UJ	All	LCS recovery	
K-40	J/UJ	All	RPD	
Ra-224	J/UJ	All	RPD	
Ra-226	J/UJ	All	RPD	
Ra-228	J/UJ	All	RPD	

Appendix 3

Qualified Data Summary and Annotated Laboratory Reports

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Project: BECHTEL-HA	KEORD		1																							
Laboratory: Quanterra			i																							
	SDG: V	V02330	1																							
Sample Number		BONKT3	BONKT4		BONKT5		BONKT6		BONK 17		BONKTB		BONKT9				1			_	T			\neg		
Location		1607-D2	1607-D2		1607-D2		1607-D2		1607-D2		1607-D2		1607-D2		 		_			_			\vdash	\dashv		
Remarks		Equip. Blank	Fleid Blank				Duplicate												 	_		_			_	
Sample Date		04/15/98	04/15/98	_	04/15/98		04/15/98		04/15/98		04/15/98		04/15/98				-		-							~
Radiochemistry	CRDL	Result Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	a	Result	q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	la
Americium-241	0.1	0.117	-0.000361	C	0.0123		0.00509	U	0.017	Г	0.0497	Г	0.00653	U	1			Г						H		+-1
Uranium-234	0.1	0.33	0.315		0.591		0.504		0.667		0.509		0.641				<u> </u>							П		$\neg \Box$
Uranium-236	0.1	0.0102 U	0,0221	U	0.0294	U	0.0172	د	0.0187	U	0.0464		0.0301	U												\top
Uranium-238	0.1	0.297 J	0.36	J	0.649	J	0.625	٦,	0.669	J	0,506	7	0.762	J										П		
Plutonium-238	0.1	0.0152 J	0.0164	U	0.00557	U	0.0501	٥	0.0226	Ü	0.0275	J	0.0194	J												77
Plutonium-239/40	0.1	0.0981 J	0.0648	L	0.1810	J	0.168	٦,	0.0995	٦,	0.375	7	0.1	7									•	П		
Americium-241GEA	0.1	0.0105 U	0.0165	U	0.0191	U	-0.00788	ے	0.00816	د	-0.00654	יב	-0.0723	٥										П		\Box
Cobalt-60	0.05	-0.000968 U	-0.000916	U	0.0117	U	-0.00435	U	0.0129	ح	0.0148	ردا	0.00939	5										П		\Box
Cesium-137DA	0.08	-0.000716 U	-0.0021	Ü	-0.00155	U	-0.00334	٥	0.00722	ح	0.00275	כ	0.00268	5												П
Europium-152	0.1	0.00308 U	0.00485	U	0.00381	U	0.0122	U	0.0112	כ	0.0211	رد	0.0295	5												
Europium-154	0.1	0.0129 U	0.0106	U	-0.0112	U	0.00671	U	0.0135	υ	0.0192	υ	0.00035	U												
Europium-166	0.1	0.00568 U	0.00726	U	-0.00954	U	0.0307	U	0.0302	U	0.0424	U	0.0235	U												
Potassium-40	N/A	3.44 J	4.73	J	8.24	7	8.26	J	8.69	J	8.52	٦,	8.68	J												
Radium-224DA	0.1	0.0957 J	0.126	_	0.468		0.444	J	0.461	J	0.418	_	0.472	_]						
Radium-226	0.1	0.0721 J	0.139	_	0.292		0.282	1	0.315		0.304	J	0.294	_										Ш		
Radium-228	0.1	0.115 J	0.172		0.438	J	0.458	J	0.444	J	0.41	J	0.487	_												\bot
Uranium-238GEA	0.1	0.256	0.307	U	0.434	ט	0.563	U	0.193		0.133	U	0.038	U		Щ	_									\bot
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LAB NAME: 1

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426101

MATRIX:

SOIL

CLIENT ID:

BONKT3

DATE RECEIVED:

4/15/1998 1:50:00 PM

			COUNTING	TOTAL		REPORT		METHOD
ANALYTE	RESULT	Q	ERROR (2s)	ERROR (2s)	MDA/IDL	UNIT	YIELD	NUMBER
HEXCHROME		U	N/A	N/A	3.00E-02	mg/kg	-N/A	EPA7196
AM-241	1.17E-01	He.	5.4E-02	5.8E-02	2.50E-02	pCi/g	79.80%	RICHRC5057
U-234	3.30E-01	معكل	8.4E-02	9.9E-02	2.14E-02	pCi/g	79.70%	RICHRC5030
U-235	1.02E-02	U	1.5E-02	1.5E-02	2.14E-02	pCi/g	79.70%	RICHRC5030
U-238	2.97E-01	JK.	8.0E-02	9.3E-02	2.66E-02	pCi/g	79.70%	RICHRC5030J
PU-238	1.52E-02		1.5E-02	1.5E-02	1.03E-02	pCi/g	78.40%	RICHRC5010
PU239/40	9.81E-02		3.9E-02	4.1E-02	1.90E-02	pCi/g	78.40%	RICHRC50101
AM-241	1.05E-02	U	1.9E-02	1.9E-02	3.15E-02	pCi/g	N/A	RICHRC5017
CO-60	-9.88E-04	U	3.9E-03	3.9E-03	6.63E-03	pCi/g	N/A	RICHRC5017
CS-137DA	-7.16E-04	Ų	3.1E-03	3.1E-03	5.14E-03	pCi/g	N/A	RICHRC5017
EU-152	3.08E-03	U	7.4E-03	7.4E-03	1.26E-02	pCi/g	N/A	RICHRC5017
EU-154	. 1.29E-02	U -	1.0E-02	1.0E-02	2.00E-02	pCi/g	N/A	RICHRC5017
EU-155	5.68E-03	U	9.4E-03	9.4E-03	1.53E-02	pCi/g	N/A	RICHRC5017
K-40	3.44E+00		1.6E-01	3.8E-01	N/A	pCi/g	N/A	RICHROSC17
RA-224DA	9.57E-02		1.1E-02	1.4E-02	N/A	pCi/g	N/A	RICHRC5017J
RA-226	ر 7.21E-02	je	1.7E-02	1.9E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228	ر 1.15E-01	y Ke	2.4E-02	2.6E-02	N/A	pCi/g	N/A	RICHRC5017J
U-238	2.56E-01		2.0E-01	2.0E-01	N/A	pCi/g	N/A	RICHRC5217
						F 9		



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426102

MATRIX:

SOIL

CLIENT ID:

B0NKT4

DATE RECEIVED:

4/15/1998 1:50:00 PM

	ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
· W	HEXCHROME	3.00E-02	U	N/A	N/A	3:00E-02	mg/kg	N/A	EPA7196
1	AM-241	-3.61E-04	U	7.2E-04	7.2E-04	1.81E-02	pCi/g	84.10%	RICHRC5057
	U-234	3.15E-01	1	8.8E-02	1.0E-01	3.86E-02	pCi/g	75.20%	RICHRC5030
	U-235	2.21E-02	U	2.4E-02	2.4E-02	3.21E-02	pCi/g	75.20%	RICHRC5030
	⁺ U-238 ~	3.60E-01	AK	9.3E-02	1.1E-01	2.74E-02	pCi/g	75.20%	RICHRC5030 J
	PU-238	1.64E-02	U	2.3E-02	2.3E-02	2.21E-02	pCi/g	40.40%	RICHRC5010
	PU239/40	6.48E-02		4.6E-02	4.8E-02	3.29E-02	pCl/g	40.40%	RICHRC5010 J
	AM-241	1.65E-02	U	2.1E-02	2.1E-02	3.54E-02	pCi/g	N/A	RICHRC5017
	CO-60	-9.16E-04	U	4.7E-03	4.7E-03	7.82E-03	pCi/g	N/A	RICHRC5017
	CS-137DA	-2.10E-03	υ	4.7E-03	4.7E-03	7.41E-03	pCi/g	N/A	RICHRC5017
	EU-152	4.85E-03	υ	1.2E-02	1.2E-02	2.12E-02	pCi/g	N/A	RICHRC5017
	EU-154	. 1.06E-02	Ų ·	1.6E-02	1.6E-02	2.92E-02	pCi/g	N/A	RICHRC5017
	EU-155	7.26E-03	U	1.5E-02	1,5E-02	2.36E-02	pCi/g	N/A	RICHRC5017
,	K-40	4.73E+00		2.5E-01	5.4E-01	N/A	pCi/g	N/A	RICHRC5017
	RA-224DA	1.26E-01		1.6E-02	2.0E-02	N/A	pCi/g	N/A	RICHRC5017 J
	RA-226	1.39E-01		1.9E-02	2.4E-02	N/A	pCVg	N/A	RICHRC5017
	RA-228	1.72E-01	J.	3,8E-02	4,2E-02	N/A	pCl/g	N/A	RICHRC5017
	U-238	3.07E-01	U	1.9E-01	1.9E-01	3.18E-01	pCi/g	N/A	RICHRC5017

Number of Results: 18

2/W/948



LAB NAME.

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426103

MATRIX:

SOIL

CLIENT ID:

BONKT5

DATE RECEIVED:

4/15/1998 1:50:00 PM

EPA7196 CHRC5057 ICHRC5030 ICHRC5030
CHRC5030
CHRC5030
ICHRC5030 J
CHRC5010
ICHRC5010 J
ICHRC5017
ICHRC5017 J
ICHRC50:7J
ICHRC5017 J
ICHRC50:7 🎞
ICHRC50-7

Number of Results: 18

W/1/98



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426104

MATRIX:

SOIL

CLIENT ID:

BONKT6

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2s)	MDA/IDL	REPORT	YIELD	METHOD NUMBER
WHEXCHROME	3.00E-02	Ш	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	5.09E-03	U	1.0E-02	1.0E-02	1.38E-02	pCi/g	74:70%	RICHRC5057
U-234	5.04E-01	ju	1.1E-01	1.3E-01	3.11E-02	pCi/g	76.80%	RICHRC5030
U-235	1.72E-02	U	2.2E-02	2.2E-02	3.89E-02	pCi/g	76.80%	RICHRC5030
U-238 -,	6.25E-01	xa	1.2E-01	1.6E-01	2.93E-02	pCi/g	76.80%	RICHRC5030 J
PU-238 005	UI -3.55E-05	10	3.2E-03	3.2E-03	5.01E-02	pCi/g	45.60%	RICHRC5010U
PU239/40	1.68E-01		7.7E-02	8.4E-02	2.40E-02	pCi/g	45.60%	RICHRC5010 J
AM-241	-7.88E-03	U	7.3E-02	7.3E-02	1.16E-01	pCi/g	N/A	RICHRC5017
CO-60	-4.35E-03	U	6.9E-03	6.9E-03	1.09E-02	pCi/g	N/A	RICHRC5017
CS-137DA	-3.34E-03	U	6.0E-03	6.0E-03	9.97E-03	pCi/g	N/A	RICHRC5017
EU-152	1.22E-02	Ų	1.7E-02	1.7E-02	3.00E-02	pCi/g	N/A	RICHRC5017
EU-154	6.71E-03	U	2.5E-02	2.5E-02	4.18E-02	pCi/g	N/A	RICHRC5017
EU-155	3.07E-02	U	2.4E-02	2.4E-02	4.06E-02	pCi/g	N/A	RICHRC5017
K-40	8.26E+00		3.0E-01	8.8E-01	: N/A	pCi/g	N/A	RICHRC5017
RA-224DA	4.44E-01		2.0E-02	4.9E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226	2.82E-01		2.4E-02	3.7E-02	N/A	pCi/g	N/A	RICHRC5017 J
RA-228	4.58E-01		5.6E-02	7.2E-02	N/A	pCi/g	N/A	RICHRC5017 J
U-238	5.63E-01	U	4.9E-01	4.9E-01	8.05E-01	pCi/g	N/A	RICHRC5017







LAB NAME: 1

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426105

MATRIX:

SOIL

CLIENT ID:

BONKT7

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
W HEXCHROME	3.00E-02	U	N/A	N/A	3.00E-02	mg/kg	N/A	EPA7196
AM-241	1.70E-02	-differ	1.7E-02	1.7E-02	1.15E-02	pCi/g	92.20%	RICHRC5057
U-234	6.67E-01	ستخلر	1.4E-01	1.8E-01	4.27E-02	pCi/g	62.70%	RICHRC5030
U-235	1.87E-02	U	2.5E-02	2.5E-02	4.07E-02	pCi/g	62.70%	RICHRC5030
U-238 ,	6.69E-01	de	1.4E-01	1.8E-01	3.29E-02	pCi/g	62.70%	RICHRC5030J
PU-238	2.26E-02	U	2.7E-02	2.7E-02	3.12E-02	pCi/g	51.80%	RICHRC5010
PU239/40	9.95E-02		5.6E-02	5.9E-02	3,54E-02	pCi/g	51.80%	RICHRC5010J
AM-241	8.16E-03	U	4.3E-02	4.3E-02	6.67E-02	pCi/g	N/A	RICHRC5017
CO-60	1.29E-02	U	7.2E-03	7.3E-03	1.40E-02	pCi/g	N/A	RICHRC5017
CS-137DA	7.22E-03	U	7.0E-03	7.0E-03	1.23E-02	pCi/g	N/A	RICHRC5017
EU-152	1.12E-02	U	1.7E-02	1.7E-02	2.93E-02	pCi/g	N/A	RICHRC5017
EU-154	1.35E-02	U	2.6E-02	2.6E-02	4.44E-02	pCi/g	NA	RICHRC5017
EU-155	3.02E-02	U	2.1E-02	2.1E-02	3.42E-02	pCi/g	N/A	RICHRC5017
K-40	8.69E+00		3.3E-01	9.3E-01	N/A	pCi/g	N/A	RICHRC50175
RA-224DA	4.61E-01		2.2E-02	5.1E-02	N/A	pCi/g	N/A	RICHRC5017J
RA-226	3.15E-01		3.4E-02	4.6E-02	N/A	pCl/g	N/A	RICHRC5017J
RA-228	4.44E-01		6.0E-02	7.4E-02	N/A	pCi/g	N/A	RICHRC5017
U-238	1.93E-01		4.2E-01	4.2E-01	N/A	pCi/g	N/A	RICHRC5017





LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426106

MATRIX:

SOIL

CLIENT ID:

BONKT8

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOE:
WHEXCHROME	3.00E-02		N/A	N/A	3.00E-02	mg/kg	N/A	EPA71
AM-241	4.97E-02	ستملد	3.1E-02	3,2E-02	1.35E-02	pCi/g	80.10%	RICHROS
U-234	5.09E-01	St	1.0E-01	1.3E-01	3.73E-02	pCi/g	80.90%	RICHROSS
U-235		ST	3.3E-02	3.3E-02	3.73E-02 3.73E-02	pCi/g	80.90%	RICHROSS
U-238 -		80	1.0E-01	1.3E-01	3.18E-02	pCi/g	80.90%	RICHROSS
PU-238	2.75E-02		2.5E-02	2.5E-02	3.16E-02 2.25E-02	pCi/g	75.90%	RICHROSS
PU239/40	3.75E-01		9.2E-02	1.1E-01	1.51E-02	pCi/g	75.90%	RICHROSS
AM-241	-6.54E-03	U	9.2E-02 2.8E-02	2.8E-02	4.45E-02	• •	73.30 % N/A	RICHROSE
CO-60	1.48E-02	u	6.6E-03			pCi/g	N/A	RICHROSE
		U		6.8E-03	1.31E-02	pCi/g		
CS-137DA	2.75E-03	_	6.4E-03	6.5E-03	1.07E-02	pCi/g	N/A	RICHROSE
EU-152	2.11E-02	U	1.6E-02	1.6E-02	2.83E-02	pCi/g	NA	RICHRCE
EU-154	. 1.92E-02	U	2.2E-02	2.2E-02	3.93E-02	pCi∕g	N/A	RICHROSE
EU-155	4.24E-02	U	2.1E-02	2.1E-02	3.39E-02	pCi/g	N/A	RICHROS
K-40	8.52E+00		3.3E-01	9.2E-01	N/A	pCi/g	N/A	RICHROS
RA-224DA	4.18E-01		2.1E-02	4.7E-02	N/A	pCi/g	N/A	RICHROSS
RA-226	3.04E-01		3.0E-02	4.3E-02	N/A	pCi/g	N/A	RICHRCE
RA-228	4.10E-01		5.2E-02	6.6E-02	N/A	pCl/g	N/A	RICHROST
U-238	1.33E-01	U	2.4E-01	2.4E-01	3.85E-01	pCi/g	N/A	RICHROSE



LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

80426107

MATRIX:

SOIL

CLIENT ID:

B0NKT9

DATE RECEIVED:

4/15/1998 1:50:00 PM

ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
W-HEXCHROME	3.00E-02	U	N/A	-N/A	3.00E-02	mg/kg	N/A	EPA7126
` AM-241	6.53E-03	U	1.4E-02	1.4E-02	2.86E-02	pCi/g	77.80%	RICHRCS057
U-234	6.41E-01	M	1.2E-01	1.6E-01	2.89E-02	pCi/g	72.60%	RICHRC5030
U-235	3.01E-02	Ű,	2.9E-02	2.9E-02	3.98E-02	pCi/g	72.60%	RICHRC5030
U-238	7.62E-01	sh	1.3E-01	1.8E-01	3.27E-02	pCi/g	72.60%	RICHRC5030
PU-238	1.94E-02	υ	2.9E-02	2.9E-02	4.07E-02	pCi/g	41.90%	RICHRC5010
PU239/40	1.00E-01		6.4E-02	6.7E-02	4.07E-02	pCVg	41.90%	RICHRC5310J
AM-241	-7.23E-02	Ų	8.3E-02	8.3E-02	1.30E-01	pCi/g	N/A	RICHRC5017
CO-60	9.39E-03	Ų	7.3E-03	7.4E-03	1.34E-02	pCi/g	N/A	RICHRC5017
CS-137DA	2.68E-03	U	6.9E-03	7.0E-03	1.19E-02	pCi/g	N/A	RICHRC5017
EU-152	2.95E-02	U	1.9E-02	1.9E-02	3.35E-02	pCi/g	N/A	RICHRC5017
EU-154	3.50E-04	U ×	2.6E-02	2.6E-02	4.09E-02	pCi/g	N/A	RICHRCS317
EU-155	2.35E-02	U	2.6E-02	2.6E-02	4.42E-02	pCi/g	N/A	RICHRC5017
K-40	8.68E+00		3.3E-01	9.3E-01	N/A	pCi/g	N/A	RICHROSS17 J
RA-224DA	4.72E-01		2.2E-02	5.2E-02	N/A	pCi/g	N/A	RICHROSO17 3
RA-226	2.94E-01		2.6E-02	3.9E-02	N/A	pCi/g	N/A	RICHRC5017 J
RA-228	4.87E-01		5.9E-02	7.7E-02	N/A	pCi/g	N/A	RICHRC5017J
U-238	3.80E-02	Ų	5.3E-01	5.3E-01	8.48E-01	pCi/g	N/A	RICHRC5017

Number of Results: 18

pr/6/1/16

Appendix 4

Laboratory Narrative and Chain-of-Custody Documentation



RECEIVED

Quanterra Incorporated 2800 George Washington Way Richland, Washington 99352

509 375-3131 Telephone 509 375-5590 Fax

CERTIFICATE OF ANALYSIS

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

May 1, 1998

Attention: Joan Kessner

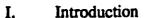
SAF Number : B98-022

Date SDG Closed : April 15, 1998

Number of Samples : Seven (7)
Sample Type : Soil

SDG Number : W02330

Data Deliverable : 15 Day Priority/21 Day Summary



On April 15, 1998, seven 15 day priority, soil samples were received by the Quanterra Environmental Services Richland Laboratory (QESRL) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Bechtel Hanford, Inc. (BHI) specific IDs:

OESRL ID#	BHI ID#	MATRIX	DATE OF RECEIPT
80426101	B0NKT3	Soil	4/15/98
80426102	B0NKT4	Soil	4/15/98
80426103	B0NKT5	Soil	4/15/98
80426104	BONKT6	Soil	4/15/98
80426105	B0NKT7	Soil	4/15/98
80426106	BONKT8	Soil	4/15/98
80426107	BONKT9	Soil	4/15/98

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

nnade



Bechtel Hanford, Inc. May 1, 1998 Page 2

The requested analyses were:

Alpha Spectroscopy

Americium-241 by method RICH-RC-5057

Plutonium-238, -239/40 by method RICH-RC-5057 Uranium-234, -235, -238 by method RICH-RC-5030

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

Chemical Analyses

Chromium Hex by EPA method 7196

III. Quality Control

The samples analyzed under SDG W02330 were processed as quick turn samples and had two Laboratory Control Samples (LCS and LCS duplicate) and one method (reagent) blank analyzed with the batch. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Alpha Spectroscopy

Americium-241 by method RICH-RC-5057

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements. Thorium-228 was present in samples B0NKT3, B0NKT4, B0NKT5 and B0NKT6, therefore, the 85% abundant peak for Am-241 at 5486 KEV was analyzed but the thorium-228 region of interest was not analyzed since it would have interfered with the americium region of interest.

Plutonium-238. -239/40 by method RICH-RC-5010

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements. The LCS had a high bias of 139.6% recovery. Since the bias met the second level of the evaluation criteria, you gave approval to report the data.

Uranium-234, -235, -238 by method RICH-RC-5030

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements.



Bechtel Hanford, Inc. May 1, 1998 Page 3

Gamma Spectroscopy

Gamma Scan by method RICH-RC-5017

The LCS, batch blank, sample duplicate (B0NKT3) and sample results are within contractual requirements.

Chemical Analyses

Chromium Hex by EPA method 7196

The LCS, batch blank, sample duplicate (B0NKT7) and sample results are within contractual requirements. The MS/MSD (B0NKT7) had low recoveries due to matrix interference.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Andy Kopriva Project Manager

anala.

Bechte	el Hanford I	nc.	CIIA	IN OF CUSTOL)Y/SAM	PLE AN	IALYSI	S REQU	JEST			1198-022-1	1 Proge	1 4 1		
Collector Mike Stankov	ich/BRYH	~~~~!~~~ ~1~		Company,Contact 'Gary Hamilton		phone No. 1-0731			Project Coa KOERNI	rdinator R, CC	-	data Turnarou		,		
roject Dealgna 100 D Areas	tion	<u> </u>		Sampling Location 1607-D2		····	-		SAF No. B98-022		15 Days					
ce Chest No.				Field Logbook Na. EL-1339-2			 -	Shipment Ivery - Gove		/chicle						
hipped To Quanterra Inc	orporated			Offsite Property No. N/A			.'	 	Bitl of fadi N/A	ng/Air Bill	No.					
	MPLE HAZARE	HARMYMAR.	······································	Preservation	Phone	<u>च्या सर</u>	Hone	Mune	None	एक्स बंध	2500 44	C Neme				
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			į	No. of Container(s)	1	1	1	1		1	1	2				
pecial Handik	ng and/or Storag	ŧ		Volume	20ml	60ml	60mi	60ml	60m)	120ml	120ml	l tooomf				
···	المال الم	SAMPLE A	NALYSIS W	0,2330	Anth-Ry Scan	Hex - 7196	Americing- 341; incorpie Pistonium; Incopie Uranium	See Item (1) in Special Instructions	Marang - 1471 - (CV)	PunPCBi - 8000 (TCL)	Beni-VO/ #270A (TO {Ble(2- uthylheny phthalas	CL) Special Instructions.				
Sample	80421	O Matrix *	Sample Date	Sample Time		804	261					804261				
ONKT3	01	Soil	4-11-98	0805	×	V	K	141	1 x 8	1× 90	14	74 V	Egip			
DNKT4	02	Soli	4-15-78		×	<u> </u>	×	1.50	/ × 41	1x	1.5		€.₩	2		
ONKTS	03	Boll	4-15-58		×	×	×	1,20	1×6.	1x	l/×	X	42	3		
ONKTO	04	Soll	4-15-98		У	×	×	1	×.8	lx.	K	K	42	4		
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Appendix 5

Data Validation Supporting Documentation

RADIOCHEMICAL DATA VALIDATION CHECKLIST

VALIDATION LEVEL:	Α	В	(C)	D	E
PROJECT:	00 D ar	ras .	DATA PACKAG	E: WOZ3	30
VALIDATOR:	TLI _	LAB: QE	<u>-</u> 5	DATE: 8/4/	
CASE:			SDG: Wo		
		ANALYSES	PERFORMED		<u></u>
Gross Alpha/Beta	Strontium-90	☐ Technetium-89	U Alphe Spectroscopy	Genrine Spectroscopy	
☐ Total Uranium	☐ Redium-22	□ Tritium	0		
SAMPLES/MAT	RIX				
	3, BONK	T4. BOX	IKTS (BONKTG	
BONKT	7, BUNI	elk Bo	NKTI	<u> </u>	
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1. Complete		• • • • • •	• • • • • •		JELN/A
Technical ve	rification for	rms present? .	• • • • • •	Yes	s No N/A
Comments:					
		· · · · · · · · · · · · · · · · · · ·		<u> </u>	
					
2. Initial	Calibration .	• • • • • •			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
Instruments/	detectors cali	ibrated within	n		•
				Ye	
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				Ye	•
					•
comments:				<u>. </u>	
				<u> </u>	· ·
					

A-16

3. Continuing Calibration	`	A/N/B
Calibration checked within one week of sample analysis?	. Yes No	N/A
Calibration check acceptable?		•.
Calibration check standards NIST traceable?	. Yes No	•.
Calibration check standards expired?	. Yes No	N/A
Comments:		
		
	,	
4. Blanks		——— П N/A
		•
Method blank analyzed?		
Analytes detected in method blank?		
Field blank(s) analyzed?		N/A N/A
Field blank results acceptable?		•
Analytes detected in field blank(s)?		
Transcription/Calculation Errors?		
Comments: PU 238 PU 239/40 RA 224		9
	+ T4 J	•
73,74,75,76,77,79 - 5		·
RAZZL 7	Fall	T
-AMZH-FB/ESS AMZYI, U-234/38 PUZSK-2	39/40 K4	0 RA-22-126/
5. Matrix Spikes		TATIN/A
Matrix spike analyzed?		1
Spike recoveries acceptable?		•
Spike source traceable?		•
Spike source expired?		
Transcription/Calculation Errors?		•
Comments:		•
·		····
		

AN

6. Laboratory Control Samples
LCS analyzed?
LCS recoveries acceptable? Yes N/A
LCS traceable? Yes No NA
Transcription/Calculation Errors? Yes No (N/A)
Comments: Po 234/40 13590
U-230 4270
7. Chemical Recovery
Chemical carrier added?
Chemical recovery acceptable?
Chemical carrier traceable? Yes No N/A
Chemical carrier expired? Yes No N/A
Transcription/Calculation errors? Yes No N/A
Comments:
•
8. Duplicates
Duplicates Analyzed? Yes No N/A
RPD Values Acceptable? Yes No N/A
Transcription/Calculation Errors? Yes No N/A
Comments: 47741-1034/ PU234 99/ PU234-178/ AMERICAN
FOLD 125 165127 750/ PENEZ-4572 / BUISH-LE/KYO-39/R9224-40
R9224 47/RAZZ4-30.21/4-27 J/JJ 7
- A

9. Field QC Samples
Field duplicate sample(s) analyzed?
10. Holding Times Are sample holding times acceptable?
Conditients:
11. Results and Detection Limits (Levels D & E) D N/A
Results reported for all required sample analyses?
Results Acceptable?
Transcription/calculation errors? Yes No NA
Comments: 11-238 TY T5 TC T8 T9 Am 241 T5 TC T9

AN



DUPLICATE RESULTS

LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

D0426101

MATRIX:

SOIL

CLIENT ID:

BONKT3

DATE RECEIVED:

4/15/1998 1:50:00 P

ORIG LAB SAMPLE ID: 80426101

ANALYTE	DUP RESULT	Q I	COUNTING ERROR (2 s)	TOTAL ERROR (2		REPOR UNIT	T YIELD	METHOD NUMBER	ORIG RESULT	RPD
AM-241	3.74E-02	J	3.5E-02	3.5E-02	3.53E-02	pCi/g	71.20%	RICHRC5057	1.17E-01	103.39%
U-234	2.95E-01	J	7.9E-02	9.2E-02	2.64E-02	pCi/g	76.70%	RICHRC5030	3.30E-01	11.17%
U-235	1.38E-02	U	1.8E-02	1.9E-02	2.99E-02	pCi/g	76.70%	RICHRC5030	1.02E-02	29.40%
U-238	3.11E-01	J	8.1E-02	9.5E-02	2.64E-02	pCi/g	76.70%	RICHRC5030	2.97E-01	4.53%
PU-238	5.13E-03	U	1.1E-02	1.1E-02	2.24E-02	pCi/g	54.80%	RICHRC5010	1.52E-02	99.28%
PU239/40	5.57E-03	U	1.1E-02	1.1E-02	1.51E-02	pCi/g	54.80%	RICHRC5010	9.81E-02	178.50%
AM-241	-7.97E-03	Ų	2.2E-02	2.2E-02	3.53E-02	pCi/g	N/A	RICHRC5017	1.05E-02	1455.12%
CO-60	-4.18E-03	U	5.1E-03	5.1E-03	8.33E-03	pCi/g	N/A	RICHRC5017	-9.88E-04	123.53%
CS-137DA	-4.06E-03	U	5.0E-03	5.0E-03	7.71E-03	pCi/g	N/A	RICHRC5017	-7.16E-04	140.03%
EU-152	-3.34E-03	U	1.2E-02	1.2E-02	2.06E-02	pCi/g	N/A	RICHRC5017	3.08E-03	4899.24%
EU-154	2.53E-02	U	1.6E-02	1.6E-02	3.12E-02	pCi/g	N/A	RICHRC5017	1.29E-02	65.13%
EU-155	5.18E-03	U	1.5E-02	1.5E-02	2.41E-02	pCi/g	N/A	RICHRC5017	5.68E-03	9.18%
K-40	5.14E+00		2.6E-01	5.8E-01	N/A	pCi/g	N/A	RICHRC5017	3.44E+00	39.68%
RA-224DA	1.43E-01		1.4E-02	2.0E-02	N/A	pCi/g	N/A	RICHRC5017	9.57E-02	39.91%
RA-226	1.17E-01		2.2E-02	2.5E-02	N/A	pCi/g	N/A	RICHRC5017	7.21E-02	47.86%
RA-228	1.56E-01	j	3.7E-02	4.0E-02	N/A	pCi/g	N/A	RICHRC5017	1.15E-01	30.21%
U-238	1.75E-01	U	1.8E-01	1.9E-01	, 3.05E-01	pCi/g	N/A	RICHRC5017	2.56E-01	37.38%



BLANK RESULTS

LAB NAME: 1

QUANTERRA, Richland

SDG /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

J042611B

MATRIX:

SOIL

								
ANALYTE	RESULT	Q	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA/IDL	REPORT UNIT	YIELD	METHOD NUMBER
 HEXCHROME	1.00E-03	U	N/A	N/A	2.00E-03	mg/L	N/A	EPA7196
AM-241	1.80E-02	J	1.8E-02	1.8E-02	1.22E-02	pCi/g	87.50%	RICHRC5057
U-234	2.09E-03	U	9.7E-03	9.7E-03	2.94E-02	pCi/g	87.20%	RICHRC5030
U-235	-7.59E-04	U	1.1E-03	1.1E-03	2.17E-02	pCi/g	87.20%	RICHRC5030
U-238	-1.90E-03	U	1.7E-03	1.7E-03	2.68E-02	pCi/g	87.20%	RICHRC5030
PU-238	2.08E-02		2.1E-02	2.1E-02	1.41E-02	pCi/g	60.50%	RICHRC5010
PU239/40	5.68E-02		3.5E-02	3.6E-02	2.09E-02	pCi/g	60.50%	RICHRC5010
AM-241	-3.75E-03	U	1.4E-02	1.4E-02	2.30E-02	pCi/g	N/A	RICHRC5017
CO-60	-1.91E-03	U	4.0E-03	4.0E-03	6.74E-03	pCi/g	N/A	RICHRC5017
CS-137DA	-1.86E-03	U	3.6E-03	3.6E-03	5.86E-03	pCi/g	N/A	RICHRC5017
EU-152	-7.49E-03	U	9.7E-03	9.7E-03	1.57E-02	pCi/g	N/A	RICHRC5017
EU-154	1.15E-02	U	9.2E-03	9.3E-03	2.03E-02	pCi/g	N/A	RICHRC5017
EU-155	7.17E-03	u	1.0E-02	1.0E-02	1.67E-02	pCi/g	N/A	RICHRC5017
 K-40	1.61E-01	u	6.3E-02	6.5E-02	1.36E-01	pCi/g	N/A	RICHRC5017
RA-224DA	3.46E-02		9.4E-03	1.0E-02	N/A	pCi/g	N/A	RICHRC5017
RA-226	7.51E-02	j	1.4E-02	1.6E-02	N/A	pCi/g	N/A	RICHRC5017
RA-228	5.13E-02	U	1.9E-02	2.0E-02	3.97E-02	pCi/g	N/A	RICHRC5017
U-238	1.42E-01	U	1.2E-01	1.3E-01	2.19E-01	pCi/g	N/A	RICHRC5017



LABORATORY CONTROL SAMPLE

LAB NAME:

QUANTERRA, Richland

SDG: /RPT GRP:

W02330 / 5017

LAB SAMPLE ID:

J042611S

MATRIX:

SOIL

ANALYTE	RESULT	Q	COUNTING ERROR (2 s)	TOTAL ERROR (2 s	MDA/) IDL	REPORT UNIT	YIELD	EXPECTED	RECOVER
HEXCHROME	4.88E-01		N/A	N/A	2.00E-03	mg/L	N/A	5.00E-01	97.60%
AM-241	4.21E+00	J	2.7E-01	6.7E-01	1.69E-02	p Ci/g	99.90%	4.52E+00	93.23%
U-234	1.74E+00		1.9E-01	3.3E-01	3.05E-02	pCVg	79.30%	1.62E+00	107.59%
U-235	9.23E-02	J	4.4E-02	4.6E-02	2.07E-02	p Ci/g	79.30%	7.37E-02	125.20%
U-238	1.62E+00		1.8E-01	3.1E-01	2.35E-02	pCVg	79.30%	1.69E+00	95.52%
PU239/40	4.74E+00		3.3E-01	7.0E-01	1.54E-02	p CVg	55.80%	3.39E+00	139.61%
CS-137DA	2.97E-01		3.0E-02	4.2E-02	N/A	pCVg	N/A	3.20E-01	92.77%
K-40	1.83E+01		7.6E-01	2.0E+00	N/A	p Cl/g	N/A	1.95E+01	93.71%
RA-226	9.84E-01		8.7E-02	1.3E-01	N/A	pCVg	N/A	1.15E+00	85.23%
RA-228	1.86E+00		1.6E-01	2.4E-01	N/A	p Ci/g	N/A	1.87E+00	99.20%
U-238	4.48E-01	U	8.2E-01	8.2E-01	1.33E+00	pCi/g	N/A	1.05E+00	42.58%

Number of Results: 11

now?

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To:	Bruce	Chris	tian	From:	Jeanet	te D	uncan
Fax:	375-	5151		Pages:	4		
Phone:				Date:	8/25	98	
Re:		<u> </u>		CC:			
□ Urge	ent 🗆 Fo	r Review	☐ Please Co	mment	☐ Please Rep	ly 🗆 F	lease Recycle
• Com	ments:		<u> </u>	<u>.</u>			-
B-	- Pleas	e look	at B	lumen	kranz's	Con	ments-
an	y que	stions	- call	Ric	h Weiss	04	1meuts - 373-5675
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	Review Com	ment Record (RC	CR)			 Date 8/25/98 Project 107-D]	Review No. BHI/QA98007 J. Page Page 1 of 1	
5. Doc	cument Number(s)/Title(s)	6. Program/Project/ Building Number	7. Revie	ewer		8. Organization/Gro	oup	9. Location/Ph	
-	30-QES (SDG No. W02330)	107-D – Soil	Claude			BHI/QA		H0-16/372-92	208
17. Con	nment Submittal Approval:	10. Agreement with indicat	ed comment disp	positio	on(s)	11. CLOSED			
Org	anization Manager (Optional)	Date	Reviewer/Point of Author/Originate		ntact	Date	_	riewer/Point of Conta	act
12. Item	13. Comment(s)/Discrepancy(s) (Procomment and detailed recommendation resolve the discrepancy/problem indicates and the commendation of the commen	ovide technical justification for the	e 14.	ld	15. Disposition	on (Provide justification i			16. Status
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3. Project 4. 107-D						
7. Reviewer 8. Organization/Group	6. Program/Project/ 7. Reviewer Building Number			5. Document Number(s)/Title(s)		
Claude Stacey BHI/QA	de Stacey	Cla	107-D – Soil	886-QES (SDG No. W02386)	W023	
indicated comment disposition(s) 11. CLOSED	disposition(s)	ted commen	10. Agreement with indicate	mment Submittal Approval:	17. Cor	
Reviewer/Point of Contact Date Author/Originator Auth			Date	ganization Manager (Optional)	Org	
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Author/Originator Auth for the 14. correct/ Hold	nator 14. Hold	Author/Orig	Date A ide technical justification for the n of the action required to correct	13. Comment(s)/Discrepancy(s) (l comment and detailed recommend resolve the discrepancy/problem in	12. Item	

Author: David B Blumenkranz at ~BHI001

Date: 8/18/98 8:03 AM

Priority: Normal

TO: Jeanette M Duncan at ~BHI012

CC: Mark H Sturges

Subject: Comments on the 107-D2 & 1607-D2 Validation packages.

------ Message Contents

My only comment is that the validator should not only look at the sample data with regards to CRDLs but also the target detection limits specified in Table II-2 of the SAP. Analyses that fail to meet the target DLs of the SAP do not require any qualification (flagging), but they need to still be addressed per the SAP. The validator need only bring to our attention those analyses that don't pass the the SAP target DLs.

We can close out the 107-D2 & 1607-D2 Validation packages, but next time, lets have the validator complete the SAP target DL comparison in addition the work that has been done to complete the 107-D2 & 1607-D2 Validation packages.

Please call me if you (or the validator) have any questions. Overall, the packages look good.

Thanks, Dave TRANSMISSION OK

TX/RX NO.

0079

CONNECTION TEL

3755151

CONNECTION ID

START TIME

08/25 12:47

USAGE TIME

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PAGES

4

RESULT

OK

Author: David B Blumenkranz at -BHI001

Date: 8/18/98 8:03 AM

Priority: Normal

TO: Jeanette M Duncan at ~BHI012

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Subject: Comments on the 107-D2 & 1607-D2 Validation packages.

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Please call me if you (or the validator) have any questions. Overall, the packages look good.

Thanks, Dave

> languago Odanjo 8/25/58

00/69/00

14.41

	Review Com	ment Record (RC		1. Date 8/25/98	2. Review No. BHI/QA98007			
						3. Project 107-D	4. Page Page 1 of	1
5. Doc	sument Number(s)/Title(s)	6. Program/Project/ Building Number	7. 1	Reviewer		8. Organization/Grou	p 9. Location	/Pbone
W023	30-QES (SDG No. W02330)	107-D - Soil	Cla	ude Stac	ey	BHI/QA	H0-16/372	-9208
7. Cop	nacesi Submittal Appeoval:	10. Agreement with indicat	led comme	ı dispositio)(s)	II. CLOSEO		
Org	anization Manager (Optional)	Date	Reviewer/P	oint of Co	otaci	Date	Reviewes/Poirs of C	
			Author/Orig	malor			Author/Originator	
12. Item	13. Comment(s)/Discrepancy(s) (Procomment and detailed recommendations) resolve the discrepancy/problem and	on of the action required to correc	e ct/	14. Hold Point	· 15. Dispositi	on (Provide justification if	NOT accepted.)	16. Status
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All accuracy results were acceptable.

Precision

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. Precision may also be assessed using unspiked duplicate sample analyses. If both sample and replicate activities are greater than five times the CRDL and the RPD is less than 30 percent for soil samples the results are acceptable. If either activities are less then five times the CRDL, a control limit of less than or equal to two times the CRDL is used for soil samples and less than or equal to the CRDL for water samples. If either the original or replicate value is below the CRDL, the applicable control limits are less than or equal to the CRDL for water samples and less than or equal to two times the CRDL for soil samples. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects or estimated non-detects.

Due to an RPD of 67.5%, all uranium-238 results were qualified as estimates and flagged "UJ".

All other duplicate results were acceptable.

Field Duplicate Sample

One pair of field duplic below:

2396

r analysis as shown

Sample No.

BONKR7

The duplicate sample determining the RPD I results were acceptab

ition guidelines for I field duplicate

Detection Levels

Reported laboratory detection levels are reviewed to ensure that they are at or below the project specific target detection limits. The reported detection limit for U-238 was above the target detection limit. Under the BHI statement of work, no qualification is required. All other reported MDAs were at or below the analyte-specific target detection limit.

samples with a spike recovery greater than 130% and a sample result less than the IDL, no qualification is required.

All matrix spike results were acceptable.

Precision

Laboratory Duplicate Samples

Laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Results must be within RPD limits of plus or minus 30% for solid samples. If RPD values are out of specification and the sample concentration is greater than five times the CRDL, all associated sample results are qualified as estimated and flagged "J". If RPD values are plus or minus two times the CRDL and the sample concentration is less than five times the CRDL, all associated sample results are qualified as estimated and flagged "J/UJ". The performance criteria for aqueous laboratory duplicates are an RPD less than 30% for positive sample results greater than five times the CRDL or plus or minus the CRDL for positive sample results less than five times the CRDL. Sample results outside the criteria are qualified as estimates and flagged "J/UJ".

All laboratory duplicate recovery results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No. Duplicate Sample No.

BONKR7 BONKR8

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against project specific target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TDLs.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No. Duplicate Sample No.

BONKR7 BONKR8

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Detection Levels

Reported laboratory detection levels are compared against project specific target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. The reported analytical detection level for toxaphene was above the TDLs in all samples. Under the BHI statement of work, no qualification is required. All other reported detection levels were at or below the TDLs.

Completeness

Data Package No. W02386-QES (SDG No. W02386) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to MS/MSD recoveries below QC limits, all aldrin and dieldrin results were qualified as estimates and flagged "J/UJ". Data flagged 'J' is an estimate, but under the BHI validation SOW, the data may be usable for decision-making purposes. All other validated results are considered accurate within the standard error associated with the methods.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No.

Duplicate Sample No.

BONKT5

BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Detection Levels

Reported laboratory detection levels are reviewed to ensure that they are at or below the project specific target detection limits (TDLs). Reported MDAs were above the TDL for U-238 in samples BONKT4, BONKT5, BONKT6, BONKT8, and BONKT9 above for / CALL TOLS.

533

Completeness

Data Package No. W verified for complete

itted for validation and

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

Due to laboratory blank contamination, plutonium-238 results in samples BONTK3 and BONTK8 were qualified as estimates and flagged "J". Due to laboratory blank contamination, the negative plutonium-238 result in sample BONTK6 was elevated to the MDA and qualified as undetected "U". Due to laboratory blank contamination, plutonium-239/240 results in all samples (except BONKT8) were qualified as estimates and flagged "J". Due to laboratory blank contamination, radium-224 results in samples BONKT3 and BONKT4 were qualified as estimates and flagged "J". Due to laboratory blank contamination, radium-226 results in all samples were qualified as estimates and flagged "J". Due to an LCS recovery of 139%, plutonium-239/240 results in all samples were qualified as estimates and

Sample No.

Duplicate Sample No.

BONKT5

BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Detection Levels

Reported laboratory detection levels are compared against project specific target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. The reported analytical detection level for toxaphene was above the TDL in all samples. Under the BHI statement of work, no qualification is required. All other reported detection levels were at or below the TDL.

Completeness

Data Package No. W02330-QES (SDG No.W02330) was submitted for validation and verified for completeness. The completion rate was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

REFERENCES

BHI, MRB-SBB-A23665, *Validation Statement of Work*, Bechtel Hanford Incorporated, September 5, 1997.

DOE/RL-96-22, Rev. 1, 100 Area Remedial Action Sampling and Analysis Plan, U.S. Department of Energy, May 1998.

Due to the lack of a matrix spike and matrix spike duplicate recovery, any RPD calculation for barium would be invalid.

All other laboratory duplicate recovery results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No. Duplicate Sample No.

BONKT5 BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. The RPD for lead was outside QC limits (48%). Under the BHI statement of work no qualification is required. All other field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against project specific target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. All reported laboratory detection levels met the analyte specific TDL.

Completeness

Data package No. W02330-QES (SDG No. W02330) was submitted for validation and verified for completeness. The completion percentage was 87.5%.

MAJOR DEFICIENCIES

Due to a matrix spike recovery of -8.7%, all barium results were rejected and flagged "R".

MINOR DEFICIENCIES

Due to blank contamination, chromium (ICP) results in samples BONKT3 and BONKT4 were qualified as undetected and flagged "U". Due to blank contamination, the lead result in sample BONKT4 was qualified as undetected and flagged "U". Due to a matrix spike recovery of 30% and a matrix spike duplicate

concentration is greater than five times the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate RPD results were acceptable.

Field Duplicate Samples

One pair of field duplicate samples were submitted to QES for analysis as shown below:

Sample No.

Duplicate Sample No.

BONKT5

BONKT6

The duplicate sample results were compared using the validation guidelines for determining the RPD between a sample and its duplicate. All field duplicate results were acceptable.

Analytical Detection Levels

Reported analytical detection levels are compared against project specific target detection limits (TDLs) to ensure that laboratory detection levels meet the required criteria. The reported detection limit was above the TDL for samples BONKT6, BONKT7, BONKT8, and BONKT9. All other reported analytical detection limits were at or below TDLs.

Completeness

Data package No. W02330-QES (SDG No. W02330) was submitted for validation and verified for completeness. The completion percentage was 100%.

MAJOR DEFICIENCIES

None found.

MINOR DEFICIENCIES

None found.

DATA QUALIFICATION SUMMARY

····	7		i
SDG: W02330	REVIEWER: TLI	DATE: 08/10/98	PAGE_1_OF_1_
COMMENTS:			
COMPOUND	QUALIFIER	SAMPLES AFFECTED	REASON
Pu-238	J	BONKT3, BONKT8	Blank contamination
Pu-238	U	BONKT6	Blank contamination
Pu-239/40	J	BONKT3, BONKT4, BONKT5, BONKT6, BONKT7, BONKT9	Blank contamination
Ra-224	J	BONKT3, BONKT4	Blank contamination
Ra-226	J	All	Blank contamination
Pu-239/40	J/UJ	All	LCS recovery
U-238 (Alpha Spec)	J/UJ	All	LCS recovery
K-40	J/UJ	All	RPD
Ra-224	J/UJ	All	RPD
Ra-226	J/UJ	All	RPD
Ra-228	J/UJ	All	RPD

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 4 August 1998

Information request - SDG W02330 - radiochemistry

Precision limits are +/- 30% per the sampling and analysis plan. The original guidance document gives limits of 35% for soils, but differentiates between samples above and below 5x the RDL. Does the above and below 5x the RDL still apply since it has an effect on qualification of data? (Page 7-6 of WHC-SD-EN-SPP-001, Rev. 1)

The 5x rule still applies to these sandes

R2 W 8-7-98

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanett Duncan

From: Bruce Christian

Pages: 1

Date: 5 August 1998

Information request: SDG 2330 - SVOA

The SAP does not specify DQOs for semi-VOAs. Do the numbers for VOAs apply or do I use the guidance document.

Use valges from SAP & VOAs as much as post possible

R2W 8-7-78

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To: BRU	we Chris	stian	From:	Jeanette	Dincan
Fax: 37	15-5151		Pages:	3	
Phone:			Dete:	87/98	
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RESULT

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To: Bruce Christi	an From:	Jeanette	Duncan
Fax: 375-5151	Pages:	4	
Phone:	Date:	8698	
Re:	CC:		
☐ Urgent ☐ For Review	☐ Please Comment	☐ Please Reply	☐ Please Recycle
• Comments:			

		SAMPLE SUMMARY	
Project ID:	100 D Areas - Full Protocol	Sampling Team:	ERC Field Sampling
Task ID:		Sampling Mgr/Coordinator:	St. John
Opperable Unit:	100-DR-1	Samplers:	STANKOVICH, MT
Aggregate Area:	100 Areas	Field Logbook ID:	EL-1339-1;EL-1339-2;EL-1339-3
SAF Number:	B98-022	Sampling Media:	Soil:

Sample Number	Laboratory Number	Location	Analyte Code	Laboratory	Date Collected	Date Shipped	Comments
В0МММ4		107-D1	2,14	Quanterra Incorporated	12/16/97 9:35 AM	12/16/97 3:35 PM	
B0MMM5		107-DI	2,14	Quanterra Incorporated	12/16/97 9:51 AM	12/16/97 3:35 PM	
Воммм6		107-DI	2,14	Quanterra Incorporated	12/16/97 10:05 AM	12/16/97 3:35 PM	
В0МММ7		107-DI	2,14	Quanterra Incorporated	12/16/97 10:22 AM	12/16/97 3:35 PM	
B0N090		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 8:30 AM	4/1/98 3:00 PM	field Blank
B0N091		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	AM	4/1/98 3:00 PM	Y
B0N092		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 10:10 AM	4/1/98 3:00 PM	
B0N093		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 9:38 AM	4/1/98 3:00 PM	
B0N094		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 10:10 AM	4/1/98 3:00 PM	Dup of BOND92
B0N095		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	AM	4/1/98 3:00 PM	
B0N096		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	AM	4/1/98 3:00 PM	
B0N097		107-Ď3	15,6,7,8,9,10,11,12, 14	TMA/RECRA	4/1/98 10:10 AM	4/1/98 1:00 PM	Split of BOND92 Epuip Blank of BONKR7
BONKR4		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:00 AM	5/21/98 1:45 PM	Epuip Blank of BONKR7
B0NKR5		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:15 AM	5/21/98 1:45 PM	
B0NKR6		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:30 AM	5/21/98 1:45 PM	
B0NKR7		107-D2	2.6.7,9,10,12,14	Quanterra Incorporated	5/21/98 8:50 AM	5/21/98 1:45 PM	
B0NKR8		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:50 AM	5/21/98 1:45 PM	Dup of BONKET

Project ID: 100 D Areas - Full Protocol

SAF Number: B98-022

Page 1 of 3

Date: 4/27/98 3:22:20 PM

Sample Number	Laboratory Number	Location	Analyte Code	Laboratory	Date Collected	Date Shipped	Comments
BONKR9		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 9:40 AM	5/21/98 1:45 PM	
BONKTI		107-D2	15,6,7,8,9,10,11,12, 14	TMA/RECRA	5/21/98 8:50 AM	5/21/98 1:00 PM	Split of BONKE7
B0NKT3		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:05 AM	4/15/98 1:50 PM	Equip Blank of BONKTS
BONKT4		1607-132	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:20 AM	4/15/98 1:50 PM	Field Blank
B0NKT5		1607-D2	1,2.4,5.6,7,8,9,10.1	Quanterra Incorporated	4/15/98 8:45 AM	4/15/98 1:50 PM	
B0NKT6		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:45 AM	4/15/98 1:50 PM	Dup of BONK TS
B0NKT7		1607-D2	1,2,4,5,6,7,8,9,10,1 1,14	Quanterra Incorporated	4/15/98 9:05 AM	4/15/98 1:50 PM	
BONKT8		1607-D2	1,2,4,5,6,7,8,9,10,1 1,14	Quanterra Incorporated	4/15/98 9:15 AM	4/15/98 1:50 PM	
BONKT9		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 9:30 AM	4/15/98 1:50 PM	
B0NKV0		1607-D2	1,15,16,5,6,7,8,9,10 ,11,14	TMA/RECRA	4/15/98 8:45 AM	4/15/98 1:00 PM	Split of BONKTS
Ворот5		116-DR-9	2,4,6,7,8,9,10,11,12 ,13,14	Quanterra Incorporated	6/9/98 9:00 AM	6/11/98 1:10 PM	
B0P892		116-DR-9	5,6,7,8,9,10,11,13,1	TMA/RECRA	7/9/98 8:15 AM	7/9/98 4:20 PM	

Analyte Codes:

- 1) Semi-VOA 8270A (TCL) {Bis(2-ethylhexyl) phthalate}
- 2) Pest/PCBs 8080 (TCL)
- 3) ICP Metals 6010A (SW-846) {Chromium, Lead}
- 4) ICP Metals 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Silver)
- 5) Mercury 7471 (CV)
- 6) Chromium Hex 7196
- 7) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)
- 8) Gamma Spec Add-on (Americium-241, Uranium-238)
- 9) Americium-241
- 10) Isotopic Plutonium
- 11) Isotopic Uranium
- 12) Strontium-89,90 Total Sr
- 13) Nickel-63
- 14) Activity Scan
- 15) PCBs 8080

Project ID: 100 D Areas - Full Protocol

SAF Number: B98-022

Page 2 of 3

Date: 4/27/98 3:22:20 PM

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l	Sample	Laboratory	Location	Analyte	Laboratory	Date	Date	Comments
١	Number	Number		Code		Collected	Shipped	·

16) ICP Metals - 6010A (SW-846) (Arsenic, Chromium, Lead)

17) ICP Metals - 6010A (Supertrace) (Chromium, Lead)

18) Rad Screen

Project ID: 100 D Areas - Full Protocol

SAF Number: B98-022

Page 3 of 3

Date: 4/27/98 3:22:20 PM

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RESULT

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanett Duncan

From: Bruce Christian

Pages: 1

Date: 5 August 1998

Information request: SDG 2330 - SVOA

The SAP does not specify DQOs for semi-VOAs. Do the numbers for VOAs apply or do I use the guidance document.

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RESULT

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 4 August 1998

Information request - SDG W02330 - radiochemistry

Precision limits are +/- 30% per the sampling and analysis plan. The original guidance document gives limits of 35% for soils, but differentiates between samples above and below 5x the RDL. Does the above and below 5x the RDL still apply since it has an effect on qualification of data? (Page 7-6 of WHC-SD-EN-SPP-001, Rev. 1)

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To: Bruce Christian	From: Deanette Duncary
Fax: 375-5151	
Phone: 325	Date: 8 4
Re:	CC:
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Salara de la Contr	Date/Time/	C Constants		•		4- 60 DA CE	portrapa) (Ass	coic, Barian,	Cadmine, O	randum, Lead	Silver)	5 %
Mer Bus	A4-51-4	3	5 4	15798	(2) (2)	Spoc Addro	(2) Gaussa Spectrocopy (Cerlus-137, Cabalt-60, Europius-152, Europius-154, Europius- 155); Gaussa Spec - Add-on (Americius-241, Uravius-238)	Jabak 40, Eun -241, Uranium	opina 151, Ga (-238)	Applemo-154, I	Sarapiaga	Z KI
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TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 4 August 1998

and

Information Request - SDG W02330 - pages 31 & 32

The sample numbers are missing from the chain of custody.

BHI SAMPLE MGT

141 001

TRANSMISSION OK

TX/RX NO.

9791

CONNECTION TEL

3755151

CONNECTION ID

START TIME

08/04 14:19

USAGE TIME

02'06

PAGES

4

RESULT

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RECEPTION OK

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9790

CONNECTION TEL

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CONNECTION ID

START TIME

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RESULT

RECEPTION OK

TX/RX NO.

9787

CONNECTION TEL

509 375 5151

CONNECTION ID

START TIME

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PAGES

RESULT

OK OK

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 4 August 1998

Information request - SDG W02330 - radiochemistry

Precision limits are +/- 30% per the sampling and analysis plan. The original guidance document gives limits of 35% for soils, but differentiates between samples above and below 5x the RDL. Does the above and below 5x the RDL still apply since it has an effect on qualification of data? (Page 7-6 of WHC-SD-EN-SPP-001, Rev. 1)

The 3x rule still applies to these samples

R2 W 8-7-98

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanett Duncan

From: Bruce Christian

Pages: 1

Date: 5 August 1998

Information request: SDG 2330 - SVOA

The SAP does not specify DQOs for semi-VOAs. Do the numbers for VOAs apply or do I use the guidance document.

USE valges from SAP & VOA, as nuch as

R2W 8-7-78

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To: Bruce Christian	4 From:	Jeonette	Divican
Fax: 375-5151	Pages	: 3	
Phone:	Date:	8798	
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BHI SAMPLE MGT

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3755151

CONNECTION ID

START TIME

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RESULT

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To:	BR	uæ	Chris	tian	From:	Jeanetle	Duncan
Fax:		75-5	-		Pages	4	
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		SAMPLE SUMMARY	
Project ID:	100 D Areas - Full Protocol	Sampling Team:	ERC Field Sampling
Task ID:	1	Sampling Mgr/Coordinator:	St. John
Opperable Unit:	100-DR-1	Samplers:	STANKOVICH, MT
Aggregate Area:	100 Areas	Field Logbook ID:	EL-1339-1;EL-1339-2;EL-1339-3
SAF Number:	B98-022	Sampling Media:	Soil;

Sample Number	Laboratory Number	Location	Analyte Code	Laboratory	Date Collected	Date Shipped	Comments
В0МММ4		107-DI	2,14	Quanterra Incorporated	12/16/97 9:35 AM	12/16/97 3:35 PM	
B0MMM5		107-D1	2,14	Quanterra Incorporated	12/16/97 9:51 AM	12/16/97 3:35 PM	
Воммм6		107-D1	2,14	Quanterra Incorporated	12/16/97 10:05 AM	12/16/97 3:35 PM	
В0МММ7		107-D1	2,14	Quanterra Incorporated	12/16/97 10:22 AM	12/16/97 3:35 PM	
B0N090		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 8:30 AM	4/1/98 3:00 PM	Field Blank
B0N091		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 8:40 AM	4/1/98 3:00 PM	Equip Dlank for BUNDTR
B0N092		107-D3	2,6,7, 8 ,9,10,11,12,1	Quanterra Incorporated	4/1/98 10:10 AM	4/1/98 3:00 PM	
B0N093		107-D3	2,6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 9:38 AM	4/1/98 3:00 PM	
B0N094		107-D3	2,6,7,8,9,10,11,12,1	Quanterra Incorporated	4/1/98 10:10 AM	4/1/98 3:00 PM	Dup of BOND92
B0N095		107-D3	2.6,7,8,9,10,11,12,1 4	Quanterra Incorporated	4/1/98 9:14 AM	4/1/98 3:00 PM	
B0N096		107-D3	2,6,7,8,9,10,11,12,1	Quanterra Incorporated	4/1/98 8:50 AM	4/1/98 3:00 PM	
B0N097		107-D3	15,6,7,8,9,10,11,12, 14	TMA/RECRA	4/1/98 10:10 AM	4/1/98 1:00 PM	Split of BOND92 Epuip Blank of BONKR7
B0NKR4		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:00 AM	5/21/98 1:45 PM	Epuip Blank of BONKR7
B0NKR5		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:15 AM	5/21/98 1:45 PM	
B0NKR6		107-D2	2,6,7,9,10,12,14	Quanterra incorporated	5/21/98 8:30 AM	5/21/98 1:45 PM	
B0NKR7		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:50 AM	5/21/98 1:45 PM	
BONKR8		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 8:50 AM	5/21/98 1:45 PM	Dup of BONKET

Project ID: 100 D Areas - Full Protocol

SAF Number: B98-022

Page 1 of 3

Date: 4/27/98 3:22:20 PM

S≢mple Number	Laboratory Number	Location	Analyte Code	Laboratory	Date Collected	Date Shipped	Comments
BONKR9		107-D2	2,6,7,9,10,12,14	Quanterra Incorporated	5/21/98 9:40 AM	5/21/98 1:45 PM	
BONKTI		107-D2	15,6.7,8.9,10,11.12, 14	TMA/RECRA	5/21/98 8:50 AM	5/21/98 1:00 PM	Split of BONKR7
B0NKT3		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:05 AM	4/15/98 1:50 PM	Equip Blank of BONKTS
B0NKT4		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:20 AM	4/15/98 1:50 PM	Field Blank
B0NKT5		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:45 AM	4/15/98 1:50 PM	
BONKT6		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 8:45 AM	4/15/98 1:50 PM	Dup of BONK TS
B0NKT7		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 9:05 AM	4/15/98 1:50 PM	
B0NKT8		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 9:15 AM	4/15/98 1:50 PM	
BONKT9		1607-D2	1,2,4,5,6,7,8,9,10,1	Quanterra Incorporated	4/15/98 9:30 AM	4/15/98 1:50 PM	
B0NKV0		1607-D2	1,15,16,5,6,7,8,9,10 ,11,14	TMA/RECRA	4/15/98 8:45 AM	4/15/98 1:00 PM	Split of BONKTS
B0P0T5		116-DR-9	2,4,6,7,8,9,10,11,12 ,13,14	Quanterra Incorporated	6/9/98 9:00 AM	6/11/98 1:10 PM	
B0P892		116-DR-9	5,6,7,8,9,10,11,13,1 4	TMA/RECRA	7/9/98 8:15 AM	7/9/98 4:20 PM	

Analyte Codes:

- 1) Semi-VOA 8270A (TCL) {Bis(2-ethylhexyl) phthalate}
- 2) Pest/PCBs 8080 (TCL)
- 3) ICP Metals 6010A (SW-846) {Chromium, Lead}
- 4) ICP Metals 6010A (Supertrace) (Arsenic, Barium, Cadmium, Chromium, Lead, Silver)
- 5) Mercury 7471 (CV)
- 6) Chromium Hex 7196
- 7) Gamma Spectroscopy (Cesium-137, Cobalt-60, Europium-152, Europium-154, Europium-155)
- 8) Gamma Spec Add-on (Americium-241, Uranium-238)
- 9) Americium-241
- 10) Isotopic Plutonium
- 11) Isotopic Uranium
- 12) Strontium-89,90 Total Sr
- 13) Nickel-63
- 14) Activity Scan
- 15) PCBs 8080

Project ID: 100 D Areas - Full Protocol

SAF Number: B98-022

Page 2 of 3

Date: 4/27/98 3:22:20 PM

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-11	ուսուրս տ	Laboratory	Location	Analyte	LECTRICAL	Date	Date	Comments
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ш	Number	Number		Code		Collected	Shipped	
- 11							7.7.	

16) ICP Metals - 6010A (SW-846) (Arsenic, Chromium, Lead)

17) ICP Metals - 6010A (Supertrace) (Chromium, Lead)

18) Rad Screen

Project ID: 100 D Areas - Full Protocol

SAF Number: B98-022

Page 3 of 3

Date: 4/27/98 3:22:20 PM

TRANSMISSION OK

TX/RX NO.

9828

CONNECTION TEL

3755151

CONNECTION ID

START TIME

08/06 14:02

USAGE TIME

02'00

PAGES

4

RESULT

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanett Duncan

From: Bruce Christian

Pages: 1

Date: 5 August 1998

Information request: SDG 2330 - SVOA

The SAP does not specify DQOs for semi-VOAs. Do the numbers for VOAs apply or do I use the guidance document.

BHI SAMPLE MGT

R∏ UUT

RECEPTION OK

TX/RX NO.

9803

CONNECTION TEL

509 375 5151

CONNECTION ID

START TIME

08/05 11:04

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PAGES

1

RESULT

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 4 August 1998

Information request - SDG W02330 - radiochemistry

Precision limits are +/- 30% per the sampling and analysis plan. The original guidance document gives limits of 35% for soils, but differentiates between samples above and below 5x the RDL. Does the above and below 5x the RDL still apply since it has an effect on qualification of data? (Page 7-6 of WHC-SD-EN-SPP-001, Rev. 1)

Bechtel Hanford, Inc. 3350 George Washington Way Richland, WA 99352

Attn: BHI Sample Management

MO-105/300 Area MSIN: L0-20 Phone: 373-5665 FAX: 373-6725

BHI Sample Management

Fax

To: BR	uce Christ	iay	From:	Jeanette	Duncay
Fax:	375-5151		Pages:	4	
Phone:	335		Date:	84	
Re:		· · · ·	CC:		
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Bechtel	Bechtel Hanford Inc.	lac.	CHA	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	Y/SAM	PLE AN	ALYSE	S REQU	EST			B98-022-11	<u> </u>	2 -
Coffector Mille Stanbovich / ISR Y-W-T	h/BRYW	<u>+~</u>		Company Contact Gary Headhon	Tek	Telephone No. 531-0731			Project Coordinator KOERNER, CC	R, CC	2	Data Turnaround 15	umd 15 Dave	
Preject Designation 100 D Aseas - Full Protocol	dia Nil Protocol			Sampling Location 1607-D2	, ,				SAF No. B98-022			•	2	
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0032

TECHLAW, INC.

451 Hills, Suite 23 Richland, WA 99352 509-375-5667 509-375-5151 (fax)

To: Jeanette Duncan

From: Bruce Christian

Pages: 1

Date: 4 August 1998

rad

Information Request - SDG W02330 - pages 31 & 32

The sample numbers are missing from the chain of custody.

TRANSMISSION OK

TX/RX NO.

9791

CONNECTION TEL

3755151

CONNECTION ID

START TIME

08/04 14:19

USAGE TIME

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PAGES

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RESULT

08/04/98

13:52

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BHI SAMPLE MGT

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RECEPTION OK

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9790

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509 375 5590

CONNECTION ID

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